

Coal Age

OCTOBER, 1943



GETTING AHEAD IN COAL ... p. 70

WHY USE TWO WHEN ONE WILL DO!



The "Dual Duty" Mine Locomotive

..... low speed for gathering

.... high speed for secondary haulage

For the first time, a locomotive has been developed to do both of these jobs efficiently. One locomotive . . . the new Westinghouse "Dual Duty" mine locomotive . . . to perform all tractive service from the face to the main haulage siding. It's your sure bet for increasing efficiency and lowering operating costs.

When the locomotive is operating behind the loading machine from reel, low speed is necessary due to the short length of each movement . . . and the temporary tracks. Under this condition, the motors operate at maximum field strength to develop maximum tractive effort at low speed . . . with minimum power consumption.

When operating from trolley on more permanent tracks, in secondary haulage service, the motor field's power may be changed to obtain an increase in speed of approximately 40%, thus enabling the locomotive to make the longer movements at an economical speed—all this with no extra operations by the motorman.

Call your nearest Westinghouse office for full details, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-15130



Westinghouse
PLANTS IN 25 CITIES . . . OFFICES . . .

Mine Locomotives



Why B. F. Goodrich water hose lasts up to 100% longer

Low water absorption, high "wet strength" cord, add years of life

B. F. GOODRICH water hose is made with rubber compounds that make it highly resistant to water absorption, swelling, carcass damage.

In accelerated laboratory tests B. F. Goodrich water hose absorbed less than half as much water as other brands tested. This means longer hose life, because water can diffuse through to the carcass to cause mildew and mold.

All types of B. F. Goodrich water hose have this longer-lived compound. And all types have "wet strength" cord—specially treated long-staple cotton that actually becomes stronger when wetted (where synthetic fibers weaken).

Tubes—All grades and types of B. F.

Goodrich water hose are fortified with Agerite, the chemical that makes rubber last longer. Most BFG water hose stands hot water; some—creamery hose for example—even take low pressure steam. Specially compounded tubes available to stand water contaminated with acids and other chemicals.

Covers—You can drag B. F. Goodrich water hose over wet concrete floors, dirt and cinder yards, use it on highways where it gets run over. It's compounded to take severe abrasion, to resist cutting and gouging. Some covers are compounded to stand oils and greases. Can be made with rubber-capped ends, that protect the carcass from moisture

wicking in. Built-in nozzles and tapered ends can be dropped anywhere without doing damage.

If you use water hose don't be satisfied without knowing what developments BFG may have made in hose for your particular type of service. To make sure you get the longest life from water hose, see your local BFG distributor. *The B. F. Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

Water Hose BY
B.F. Goodrich

Give Friction Devils

NOTHING

"**WE HATE HULBURT GREASE!**"

"**WE WANT FRICTION!**"



"**WE'RE
STARVING!**"

Serve howling Friction Devils a dinner of **HULBURT QUALITY GREASE** — and keep 'em on that diet — and you'll see how quickly they clear out of your mine, and how thankful you'll be to **HULBURT** for better operation, and lower lubricating and maintenance costs.

HULBURT OIL & GREASE COMPANY, PHILADELPHIA, PA.

Specialists in Coal Mine Lubrication

*To be **THANKFUL FOR!***



Hulburt *Quality*
GREASE

starves Friction Devils out of your Coal Mining Machinery, because it is made to do exactly that one thing, and do it supremely well. For it alone has certain qualities that meet the most difficult coal mine conditions — a fact that you can prove by letting us send a qualified engineer right down into your mine to demonstrate that **HULBURT QUALITY GREASE** can, and will, save you money and trouble.

**IT COSTS NO MORE TO HAVE THIS
PROTECTION AT YOUR MINE**

HAZAPRENE ZBF APP. NO. P-104 BM

HAZAPRENE ZBF^{*} SHEATH

**Unequalled for Flame-Resistance — standard
on all Hazacord Portable Mining Cables**

HAZACORD Mining Machine Cables — Fine copper wires, Hazaloy coated or tin-coated for corrosion protection, provide a flexible, easy-to-handle cable. Long-lived, heat-resisting. Performite insulation over the conductors has an operating temperature of 75 C. This provides a safety margin of about 25% to withstand overload surges. Hazaprene fillers (not jute) are used to prevent wicking in of moisture through cable ends. Available in Twin-Parallel, Concentric or Two Conductor Round Types.

***ZBF**

ZINC BORATE FORMULA

Flame tests have shown that Zinc Borate imparts greatly increased fire-resistant properties to neoprene compounds with burning rates reduced by as much as 20% and weight losses by as much as 40%. Afterglow is materially reduced also. Millions of feet of cable protected by this type of sheath were used during the war by the Navy for special operating conditions to gain extra fire protection. Hazaprene ZBF Sheaths mean not only greater safety because of unusual flame-resistance and lack of afterglow — but also longer life through increased resistance to abrasion, wear and tear.

In more and more mines every day, electrical men are turning to Hazacords to gain the extra safety provided by the Hazaprene ZBF Sheath. This basic improvement developed by Hazard in neoprene sheaths has all the qualities important to long cable life — oil, water, acid and heat resistance, good flexibility combined with enduring toughness — *plus a resistance to flame never before obtainable.*

And under this Hazaprene ZBF Sheath, you'll find each Hazacord Mining Cable has its individual service-engineered features to assure — from every cable component — safe, trouble-free operation. For complete information, ask your Hazard representative or write Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.



TYPE SH-A

HAZACORD Shovel and Dredge Cable —

three separate conductors are individually protected with heat-resisting Keystone insulation and color-coded for quick, lasting identification. They are cabled together with Hazaprene fillers for extra flexibility and moisture tightness. A reinforced double layer Hazaprene ZBF Sheath provides over all protection, and, like all Hazaprene ZBF Sheaths, is pressure cured in a continuous metal mold for increased density and long life. Available in Types G, W, and Type SH, which has four different styles to best meet voltage pressures and operating conditions.

HAZACORD Flexible Cords

(rated at 600 volts) for hand-held mine drills are protected with this tough, durable Hazaprene ZBF Sheath that withstands the most severe service. Hazacord's safety features have earned approval by law for underground mine use. Each is marked with Pennsylvania Dept. of Mines Approval P104 and more than meets their high standard of flame-resistance. Hazacords are also available in Type SO and SJO to meet every mining need for portable tools, appliances, drop lights, etc.



HAZARD



insulated wires and cables for every mining use

7474

Coal Age

Alfred M. Staehle, Publisher Ivan A. Given, Editor
J. H. Edwards W. H. McNeal W. A. Stanbury Jr.
H. Davis F. A. Zimmerli G. E. Doying Jr., Washington
R. W. Davis, Sales Manager
World News Offices: London, Paris, Frankfurt, Tokyo, Bombay,
Melbourne, Rio de Janeiro, Mexico City

Volume 54

CONTENTS • NOVEMBER • 1949

Number 11

Editorial: At the Turn?	69
Getting Ahead in Coal Mining	70
Building up Glen Mary	76
Marking Machine Saves Coal	80
Training for Safety—J. J. PLASKY	82
How Stainless Steel Improves Screening Results—C. G. PURNELL	88
Coal: Fallacy and Fact—REED MOYER	91
Safety With Continuous Mining—R. T. ARTZ	94
Flume and Trestle Solve Diversion Problem	102
Steel Car Stops Promote Haulage Safety	102
Compressed-Air Tools Facilitate Car Repairs	104
Warehouse Truck Made Safer	106
Extra Brackets on Supply Truck Prevent Stake Loss	108
Screen Plates Keep Jeep Bottom Clean	108
Cold-Weather Fuel-Pump Protection	108
Coal Men on the Job 96	Foremen's Forum 98
Equipment News 110	News Round-Up 131

COAL AGE (with which is consolidated "The Colliery Engineer" and "Mines and Minerals") is published monthly on the 1st. After at least ten days for change of address. **COAL AGE** articles are indexed regularly by Engineering Index, Inc. **COAL AGE'S** own index published annually may be had on request to the Editorial Department. Contents Copyright 1949 by McGraw-Hill Publishing Co., Inc.; all rights reserved.

McGraw-Hill Publishing Company, Inc.—James H. McGraw (1860-1948), Founder, James H. McGraw Jr., President; Curtis W. McGraw, Vice President and Treasurer; Eugene Duffield, Senior Vice President, Publication Division; Nelson Bond, Vice President and Director of Advertising; Joseph A. Gerardi, Secretary; Dexter Knepper, Director Economic Department; J. E. Blackburn Jr., Vice President and Director of Circulation.

Subscription Information: All communications about subscriptions should be addressed to the Director of



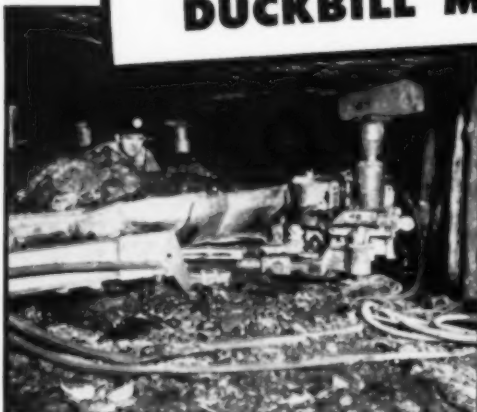
Circulation, **COAL AGE**, 210 South Desplaines St., Chicago 6, Ill., or 330 W. 42nd St., New York 18, N. Y. Please indicate position and company connection on all subscription orders. Subscription rates: United States and possessions, \$5 for one year, \$8 for two years, \$10 for three years. Canada, \$6 for one year, \$10 for two years, \$12 for three years. Pan-American countries, \$6 for one year, \$10 for two years, \$12 for three years. All other countries, \$15 for one year, \$25 for two years, \$30 for three years. Single copies, U. S. and possessions and Canada, 50c; Pan-

American countries, 75c; all other countries, \$1.50. Entered as second-class matter Aug. 27, 1948 at the Post Office at Chicago, Ill., under the Act of March 3, 1879. Return postage guaranteed. Printed in the U. S. A. Cable Address: "McGraw-Hill, N. Y." Member A.R.P. Member A.B.C.

Publication offices: 210 South Desplaines St., Chicago 6, Ill. **Editorial and executive offices:** 330 W. 42nd St., New York 18, N. Y. **Branch offices:** 520 North Michigan Ave., Chicago 11; 68 Post St., San Francisco 4; Abbeys House, Abbeys, London, W. C. 2; Washington, 4; Philadelphia, 3; Cleveland, 15; Detroit, 28; St. Louis, 1; Boston, 16; Atlanta, 3; Los Angeles, 16; 738-9 Oliver Bldg., Pittsburgh, 23; Dallas, 1.

District Managers: Atlanta, R. C. Maulsby; Chicago, C. J. Cash and C. A. Mark; Cleveland, W. M. Moore; Dallas, J. H. Allen; Los Angeles, C. W. Dwyer; New York, T. E. Alcorn and F. W. Best; Philadelphia, W. A. Potter; Pittsburgh, H. C. Charlton; San Francisco, J. W. Otterman.

HOW TO CUT *YOUR* DUCKBILL MOVING TIME!



HYDRAULIC JACK for anchoring power duckbills, shown in operation (left) and with its tilting base (right) saves considerable move-up time and holds more securely than the screw jack formerly used at Reels Cove mine.

Hydraulic Jacks Slice Duckbill Moving Time

REPLACEMENT of screw jacks by hydraulic jacks have cut move-up time for power duckbills from more than half an hour to 10 minutes at Reels Cove mine of the Tennessee Products & Chemicals Corp., Whitwell, Tenn. One man now tightens the jacks and they hold without fail. Formerly, three men using screw jacks and a 4-ft. piece of pipe as a lever often did not set them tight enough to hold during the loading of a cut, particularly if the threads had been allowed to get dirty.

Three 30-ton hydraulic jacks made by the Hein-Werner Corp., Waukesha, Wis., are employed. They are 11 in. high and have an extended height of 18 in. To facilitate angling the jacks against the roof, special bases that permit tilting and rotating were made in the mine shop. To limit tipping to about 20 deg. from vertical when the jack is not in use, low railings of 1/2-in. round steel were welded to the machine frame.

Three hydraulic jacks for a unit cost

about \$180, but the additional investment has proved highly profitable, it is reported. Since heavy work is not required in tightening, the crew's job is more pleasant and, in addition, the jacks are really set tight. When the hydraulic type was first tried, there was some doubt whether they would hold pressure for a sufficient period of time. They have proved very effective, however, and after a week-end shutdown often are found tight enough to operate without being taken up.

Article above reproduced from COAL AGE, May, 1949. Copyright McGraw-Hill Publishing Co., Inc., N. Y. C.

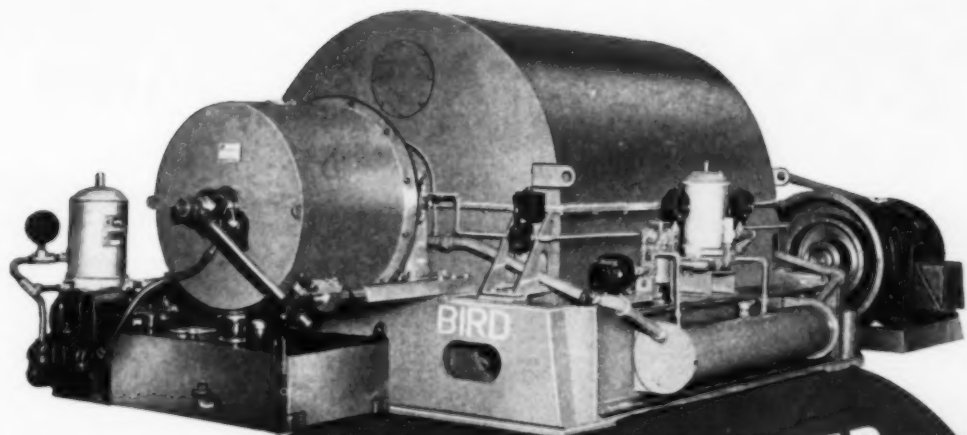


A HEIN-WERNER HYDRAULIC JACK IS A BASIC INDUSTRIAL TOOL

Powerful, easy-operating H-W Hydraulic Jacks are made in models of 1½, 3, 5, 8, 12, 20, 30, 50 and 100 tons capacity. Each one is factory-tested at 1½ times rated capacity. Write for catalog covering complete line.



HEIN-WERNER
Corporation
WAUKESHA • WISCONSIN



THIS BIRD TAKES OVER The Toughest of Your Preparation Problems

After you've washed all that $\frac{1}{4}$ " x 0 coal, the big headache is getting the water out of it — or rather, it *was* a big headache until the Bird Coal Filter came along.

The Bird takes the place of the whole series of expensive operations otherwise required.

It gets this fine coal, which may contain ten per cent or so minus 200 mesh fines, down to 8 to 10% moisture, well blended, ready for direct loading or thermal drying.

It permits a closed water circuit.

There are sizes for any need up to a ton of coal a minute.

It runs for months without a maintenance shut-down.

It's worthy of immediate consideration for existing as well as new preparation plants.

Ask us to mail you a copy of the Bird Coal Filter Bulletin.

BIRD MACHINE COMPANY, South Walpole, Mass.

The BIRD

**Continuous Centrifugal
COAL FILTER**



cars

START

and they

WHEN WHEELS ARE LUBRICATED



TEXACO MAINTENANCE LUBRICATION CHARTS: Leading manufacturers of underground coal mining machinery approve Texaco lubricants for use on cutters, loaders, locomotives, etc., and have cooperated in preparing these charts. Charts show clearly where and when to use the proper Texaco lubricant. Order the charts you need by make and model of each machine.



TEXACO LUBRICANTS

roll with the greatest of ease
WITH TEXACO OLYMPIAN GREASE



Photo courtesy American Car and Foundry Company

EVEN in winter weather, trains start more easily . . . roll more smoothly . . . when car wheel bearings (plain, cavity hub or anti-friction) are lubricated with *Texaco Olympian Grease*. This lubricant greatly reduces frictional "drag."

Texaco Olympian Grease resists oxidation. It seals bearings against dirt and moisture . . . won't leak out in service or separate in storage. It retains its effective lubricating qualities regardless of seasonal weather changes.

Texaco Olympian Grease is made in three consis-

tencies especially for mine service. Use it in car wheels to assure uninterrupted movement of tonnage and lower bearing maintenance costs.

Let a *Texaco* Lubrication Engineer help you increase efficiency and reduce costs throughout your mine. Call the nearest of the more than 2300 *Texaco* Wholesale Distributing Plants in the 48 States, or write The Texas Company, *National Sales Division*, Dept. C, 135 East 42nd Street, New York 17, N. Y.

ASSURE TROUBLE-FREE HYDRAULIC SYSTEMS

Use *Texaco Regal Oils (R & O)* for the hydraulic fluids in mechanisms of shovels, dump trucks and other equipment. These turbine-grade oils will keep systems free of rust and sludge . . . assure smooth, uninterrupted operation.

For the Coal Mining Industry

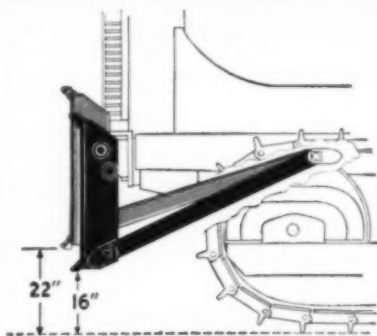
HD-19 TORQUE OUTPUSHES



On Any Stripping Job, Any Time

BIG VOLUME You get heaping loads fast with the BIG HD-19 pushing your scrapers on stripping work. A powerful, 40,000 lb. tractor with long, wide, sure-gripping tracks . . . it gets in there and really "bears down."

What's more — makes contact faster with any make or type scraper combination — no trundling along behind trying to catch up. Hangs on, too, throughout entire loading period — no losing scraper, no sudden, jarring contacts because there's no stopping to shift. Torque Converter automatically synchronizes HD-19's speed with speed of loading unit. And with a final, extra boost, gets scraper off with a flying start. Result — **MORE YARDS MOVED AT LESS COST PER YARD.**



**NEW HEAVY-DUTY, ADJUSTABLE
PUSHER PLATE NOW AVAILABLE
FOR HD-19.** It's bigger, stronger, heavier — weighs 1,600 lbs. It's adjustable — operates at 16" or 22" above ground . . . pushes any make scraper or self-powered hauling unit.

CONVERTER TRACTOR *OUT-'DOZES*



Of Year, Under Any Conditions

Shortens TIME ON EVERY BULLDOZING JOB

The heavier, sure-footed, better-balanced HD-19, working with especially matched bulldozers — plus having the advantages of the Torque Converter drive — assures greater output on bulldozing. Operator can take a deeper cut, roll bigger loads faster . . . and get back for the next pass quicker — has a high reverse of 5.5

m.p.h. Load and terrain and use of throttle govern forward speed . . . and there's no worrying about engine stalling when tractor is overloaded — keeps running, regardless.

And because the HD-19 is on tracks it can be used everywhere on your operation — on wet, sandy or rocky going . . . no job too tough for it to handle. "Seeing is believing" . . . watch it outperform. Contact your Allis-Chalmers dealer.

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.
ORIGINATOR OF THE TORQUE CONVERTER TRACTOR

Answer TO AN OLD TRACK PROBLEM



In the past, training a mine-track crew has often been slow, expensive business. But many of the delays and complications have been eliminated in mines using Bethlehem prefabricated trackwork. Putting it together is so simple that almost anyone can get the hang of it in no time.

In the first place the number of different rail lengths—both straight and curved—is held to an absolute minimum in Bethlehem mine track. Second, rails and special ties are clearly marked for identification and keyed to blueprints of the system furnished the track crew.

Every Bethlehem prefabricated layout is planned individually for the mine involved, after exhaustive studies of the mine's requirements. Our years of research have enabled us to develop prefabricated track that is equally suitable for both advancing and

retreating; for both the block system and the room-and-pillar system. Bethlehem prefabricated track can be adapted equally well to 45-, 60-, and 90-deg turns, and to others where required. In addition, it is equipped with reversible stock rails, which can be used for either right- or left-hand turnouts.

These are a few of the reasons why a Bethlehem layout is easy to handle and install; why crews "catch on" so quickly. For more details, call or write the Bethlehem office nearest you. One of our engineers—a specialist in track—will gladly give you the full story and make any desired recommendations.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation



BETHLEHEM PREFABRICATED TRACK



Price of the standard D8 Tractor is \$12,650; No. 25 Cable Control, \$1420; No. 80 Scraper, \$9070. All prices f.o.b. Peoria, Illinois, subject to change without notice.

PUTTING SPOIL BACK TO BED THE EASY WAY

Backfilling overburden the quickest and cheapest way points straight to the use of "Caterpillar" Earthmoving Equipment. The picture shows an ideal procedure on a worked-out coal seam in England, namely: Down-hill loading of a big-capacity "Caterpillar" No. 80 Scraper pulled by a powerful "Caterpillar" D8 Tractor; up-hill back-travel when the Scraper is empty.

Contributing to the speed and low operating cost of this specially matched unit are these facts-and-features:

1. Scraper designed for extra-large tires . . . means less rolling resistance and good load flotation in loose or soft earth.
2. Blade and bowl designed for funneling hard-to-dig material high into the bowl.

3. "Dozer type" ejection . . . rolls the material out like a "Caterpillar" Bulldozer blade.
4. High apron lift for ease in ejecting sticky material.
5. Open-top bowl with cable amply protected for shovel-loading; double-bottom bowl to help absorb shock of shovel-loading.
6. Low maintenance cost through finely engineered design . . . perfectly matched to the tractor that pulls it.

All over the world, "Caterpillar" Diesel Tractors and Scrapers are doing earthmoving jobs faster and more economically than they've ever been done before. See your "Caterpillar" dealer and be completely convinced that "Caterpillar" is the equipment to buy. Meantime, use the coupon. No obligation.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

CATERPILLAR
REG. U. S. PAT. OFF.
DIESEL
ENGINES • TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

CATERPILLAR TRACTOR CO.
Dept. CA-11, Peoria, Ill.

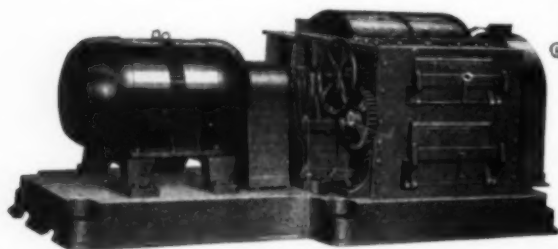
Send me the booklet, "Three Steps of Strip Mining."

Name

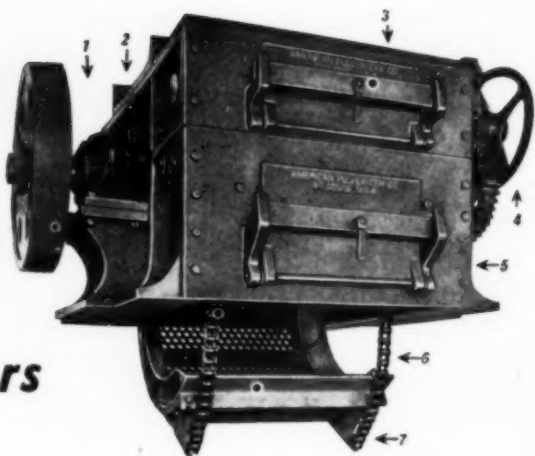
Address

A NEW ANGLE TO COAL PREPARATION *With American Rolling Ring Crushers*

The gains in tonnage underground are too easily offset by obsolete coal preparation at the top, resulting in too small a yield of the most marketable sizes. Control your sizing with the most modern crusher action which *splits*—instead of crushes—coal. Size control is continuously maintained with a minimum of undesirable fines—and with no over-size. Americans are flexible, with a wide range of reduction, to suit varying market demands.

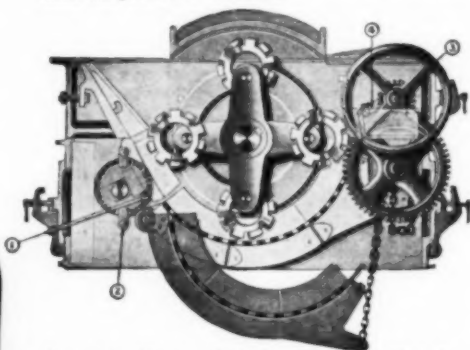


Americans are available in capacities of 50 to 500 TPH.

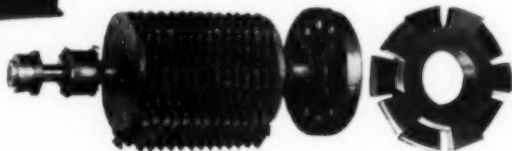


7 OPERATING FEATURES

(1) Dust-tight, grease-lubricated, self-aligning pillow blocks with anti-friction bearing. (2) Massive sectional steel frame with dust-tight machined joints. (3) Door to easily cleaned metal trap. (4) Hand-wheel to adjust the position of setting of cage. (5) Inspection door to crushing chamber. (6) Chains to raise and lower cage. Raising cage makes product finer, lowering cage makes product coarser—or cage can be dropped completely as shown. (7) Screen cage with sectional manganese steel side liners.



Rows of shredder rings (below) each with 20 cutting edges revolve freely on their own shafts. Cage prevents oversize, rotor revolves slowly, keeping fines to a minimum.



Write for "AC Coal Crushing Bulletin."

American

Originators and Manufacturers of
Ring Crushers and Pulverizers

PULVERIZER COMPANY

1119 Macklind Avenue
St. Louis 10, Mo.



Like two tires in one!

HERE's the double-duty pit and quarry tire specially built to handle two jobs. ON the road it rolls long and smooth, pays off on mileage—OFF the road it gives super-traction. It's Goodyear's new, improved Road Lug.

The Road Lug's alternately spaced lug bars are big and husky—bite right in on dirt and other unpaved surfaces for positive traction. But when it hits the highway, its long continuous center strip gives smooth rolling,

long economical mileage.

This remarkable dual-purpose tire has extra-strong carcass and undertread—tapered grooves between the lugs to prevent the picking up and holding of stones—wider spaced, deeper lug bars. Put all these outstanding features together in one tire and you have the perfect tire for pit and quarry hauling—Goodyear's new, improved Road Lug. Remember, always **BUY** and **SPECIFY** Goodyear—it pays!

The Super-Stamina Tire
For OFF-THE-ROAD Hauling
The HARD ROCK LUG



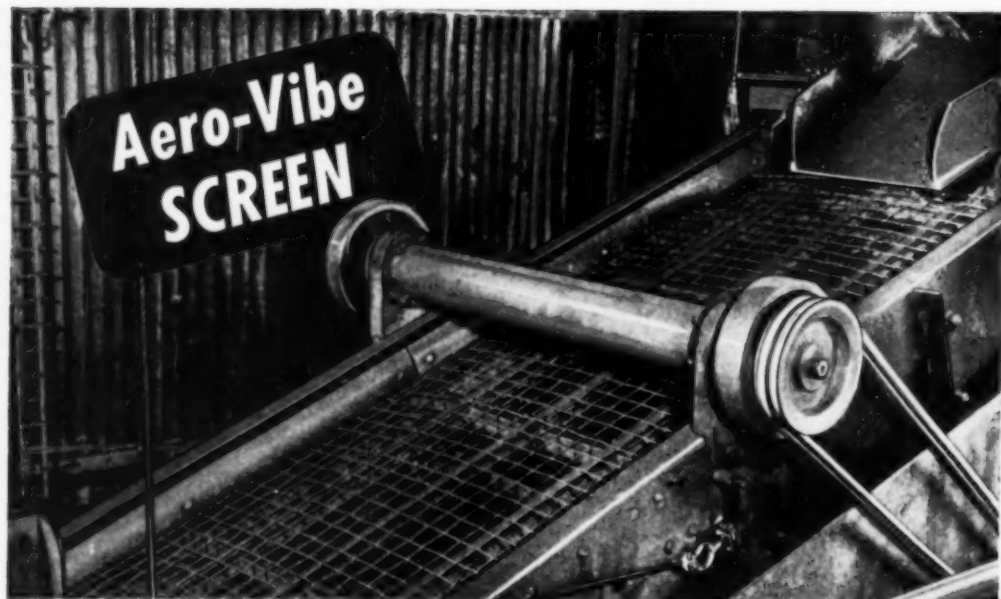
This extra-husky tire is best for all OFF-THE-ROAD tire-ripping, tire-bruising jobs. Ask your Goodyear dealer about it now!

We think you'll like "THE GREATEST STORY EVER TOLD"—Every Sunday—ABC Network

Road Lug—T.M. The Goodyear Tire & Rubber Company

GOOD YEAR

MORE TONS ARE HAULED ON GOODYEAR TIRES THAN ON ANY OTHER KIND



After 10 Years, Still "Low on Maintenance, High on Sizing Efficiency!"

MORE THAN 10 YEARS AGO this processor installed the 5x10 ft double deck *Aero-Vibe* screen shown above. Today this Allis-Chalmers vibrating screen is still going strong... still producing 100 tons per hour of graded 3 x 1½ and 2 x 1½-inch products—and working two shifts every day.

Operators say, "maintenance has been very low...sizing efficiency very good." And that's typical of owner reports wherever this economical, low-cost vibrating screen has been installed.

Aero-Vibe screen utilizes the most simple of vibrating mechanisms, a two-bearing concentric shaft with off-center weights. Amplitude of vibration can be changed easily by adjusting outer counterweights on each side.

CHECK AERO-VIBE SCREEN FEATURES

►Designed for small tonnages . . . or

Aero-Vibe, Ripl-Flo, Low-Head are Allis-Chalmers trademarks.

for auxiliary sizing service.

►Handles up to 3-inch feed size.

►Makes separations from 20-mesh to 13½ or 1½-inches square.

There is an Allis-Chalmers representative near you who will gladly look over your operations and tell you just where *Aero-Vibe* screens may help you save money and speed production. Call him today, or write for Bulletin 07B6099.

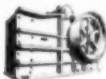
Aero-Vibe is one of a complete line of vibrating screens built by Allis-Chalmers. Others include the *Low-Head* horizontally operating screen and the *Ripl-Flo* inclined deck sizing screen. Both are widely used in rock and ore preparation. A-C offices or distributors in principal cities in the U.S.A. and throughout the world.

A-2816

ALLIS-CHALMERS, 968A SO. 70 ST.
MILWAUKEE, WIS.



Kilns, Coolers, Dryers



Jaw Crushers



Hoists



Mills



Gyratory Crushers



Vibrating Screens

AND OTHER EQUIPMENT
FOR THE CRUSHING, CEMENT
AND MINING INDUSTRIES



ALLIS-CHALMERS



Here's good news for long-range communication circuits ... a new Simplex Polyethylene - PLASTEX Communication Cable that insures increased signal strength under all conditions of aerial, duct, and underground service.

Insulated with a thin wall of Polyethylene over each conductor and protected by an outer jacket of PLASTEX, this new Simplex cable is small in diameter and exceptionally light in weight.

But here are the features that make it "tops" for performance and dependability ...

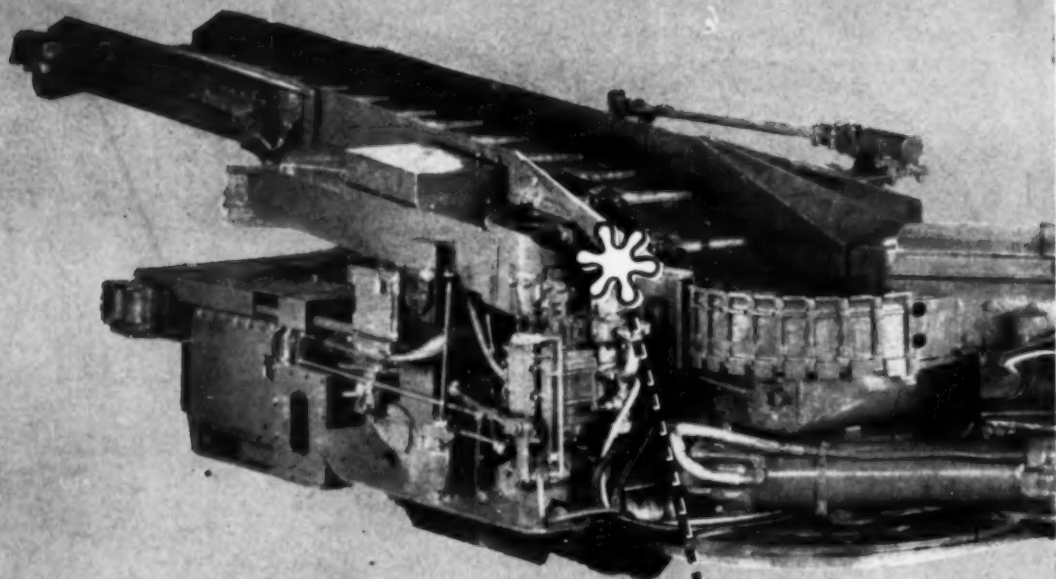
The polyethylene insulation has low power factor and low dielectric constant — your assurance of maximum transmission distance. It is especially suitable for circuits having carrier frequencies exceeding 50 kilocycles. It provides high insulation resistance and unusually low water absorption.

The specially - compounded PLASTEX jacket is tough, flexible, and protects the cable against oxidation, flame, water, oil, chemicals, sunlight and weather hazards. Its stability over a wide temperature range permits operation at temperatures as high as 176°F. in dry locations, 140°F. in wet or oily locations. It assures resistance to cracking at temperatures as low as -58°F.

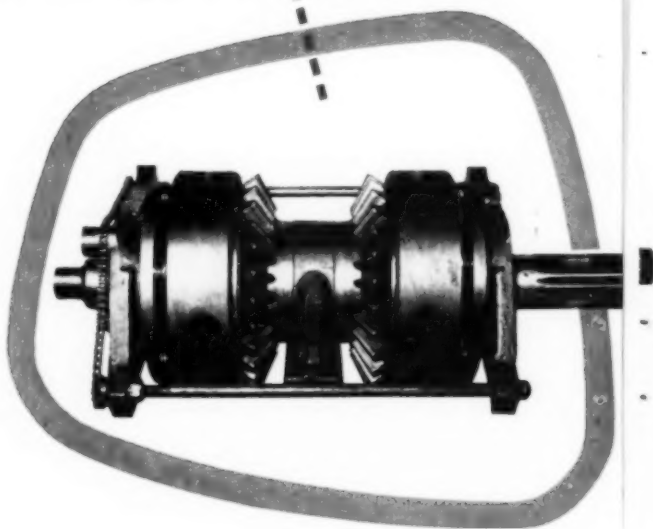
For more complete information and, if you wish, help in working out the details of your circuits, contact the Simplex representative in your area or write direct.

SIMPLEX WIRES AND CABLES

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

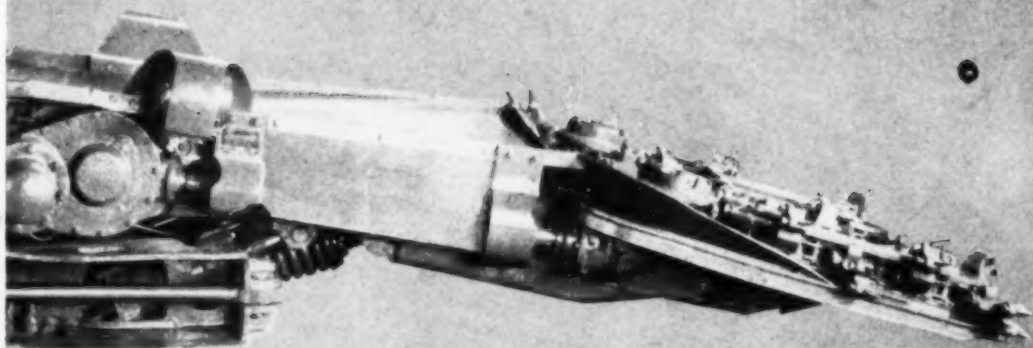


Get these savings in your clutches



STANDARD OIL COMPANY (INDIANA)

S



If you're looking for increased loader efficiency, don't overlook the importance of clutches. There is much evidence to prove that better clutch operation cuts maintenance costs and boosts tonnage. The evidence is equally clear that Superla Mine Lubricants contribute to efficient clutch operation in at least three important ways:

ELIMINATE WARM-UP TIME. Superla Mine Lubricants are fluid at low temperatures. When machines start, the lubricant readily flows over clutch plates. This eliminates drag, permits loading operations to be started immediately.

SHORTEN LOADING TIME. Superla Mine Lubricants keep clutch plates clean and free for action. This allows smooth operation of clutch controls. Machines can be handled more easily. Loading takes less time.

REDUCE REPAIR COSTS. Superla Mine Lubricants do not thin out excessively at machine-operating temperatures. This

quality assures proper lubrication of clutches during long periods of continuous operation. Safer and cleaner lubrication keeps clutch maintenance at a minimum. Loaders stay on the job longer, load out more coal.

A trial of Superla Mine Lubricants in your equipment will prove their ability to make savings for you. Grades are available for both oil- and grease-lubricated loaders. Ask for the services of a Standard Oil Lubrication Engineer.

Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

Superla Mine Lubricants

STANDARD OIL COMPANY (INDIANA)



JEFFREY

Haulage Locomotives

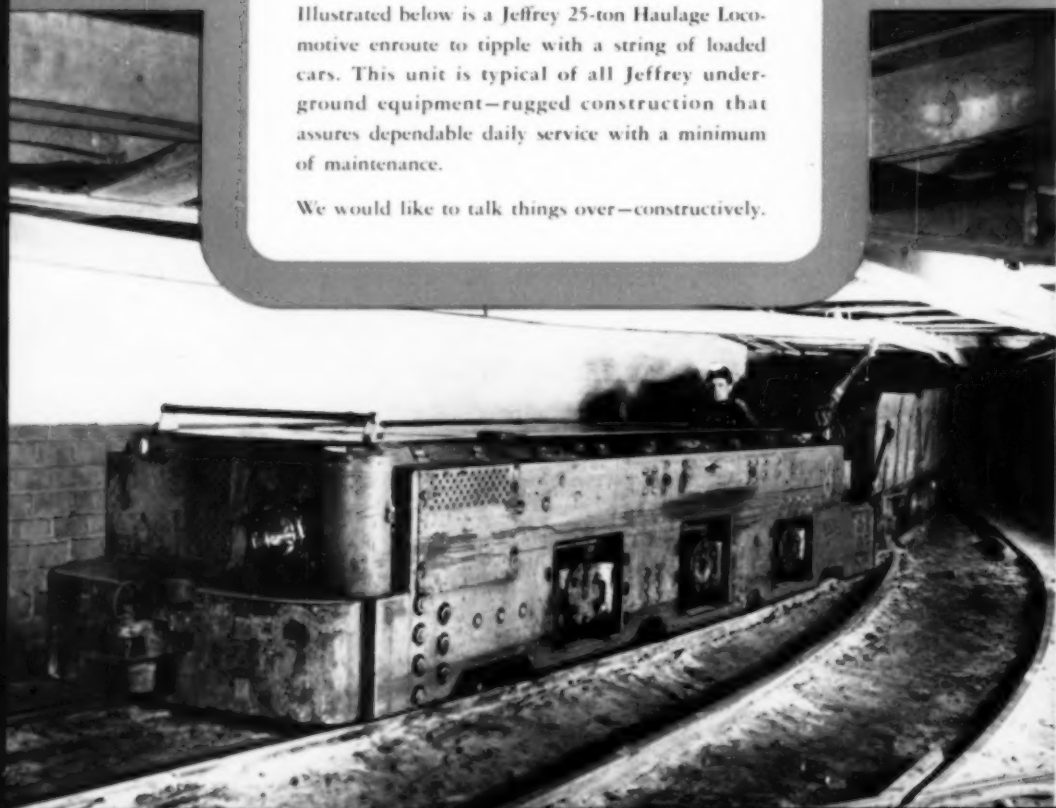
MEET ALL OPERATING CONDITIONS

Jeffrey Locomotives form an important link in mine transportation systems due to their continuous, low cost operation. Jeffrey has been designing and building them for years . . . in trolley, cable reel or storage battery types to meet specific mining conditions.

Experienced Engineers are available to help you determine the type and model Jeffrey Locomotive best suited to your operation. They are highly trained . . . have the facilities for building and installing modern coal mine equipment all along the line—from face to tippie.

Illustrated below is a Jeffrey 25-ton Haulage Locomotive enroute to tippie with a string of loaded cars. This unit is typical of all Jeffrey underground equipment—rugged construction that assures dependable daily service with a minimum of maintenance.

We would like to talk things over—constructively.

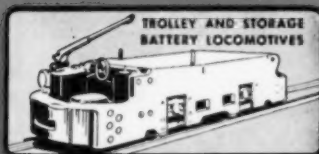




LOADING
MACHINES



CONVEYOR-
LOADERS



TROLLEY AND STORAGE
BATTERY LOCOMOTIVES



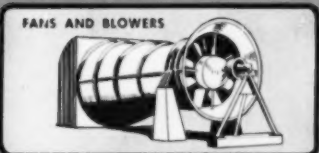
DRILLS AND DRILLING MACHINES



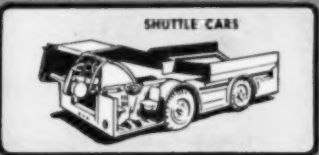
UNIVERSAL
COAL CUTTERS



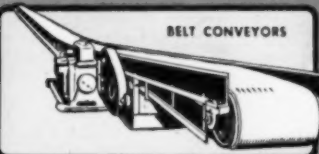
SHORTWALL COAL CUTTERS



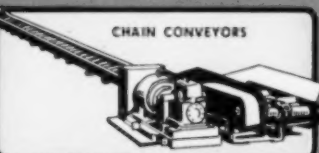
FANS AND BLOWERS



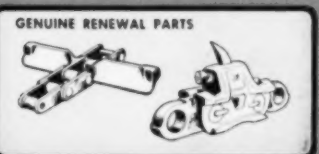
SHUTTLE CARS



BELT CONVEYORS



CHAIN CONVEYORS



GENUINE RENEWAL PARTS

JEFFREY

EQUIPMENT

FOR COAL MINES

and

GENUINE RENEWAL PARTS



THE JEFFREY MANUFACTURING COMPANY

Established 1877

General and Export Sales Offices

COLUMBUS 16, OHIO, U. S. A.

DISTRICT SALES OFFICES

BALTIMORE 2, MD.
Munster Bldg.
BIRMINGHAM 1,
2210 Third Ave. N.
BOSTON 14,
18 Newbury Street
BUFFALO 2,
Jackson Building
CHICAGO 1,
Bell Building
CINCINNATI 2,
Carew Tower
CLEVELAND 11,
Rockefeller Building

DENVER 2,
Ehrst & Cranmer Bldg.
DETROIT 11,
508 St. Jean Avenue
HARLAN,
Kentucky
HOUSTON 5, TEXAS
1718 Ave. Bldg.
HUNTINGTON 19, W. VA.
Guaranty Bank Bldg.
JACKSONVILLE 5,
4114 Forest Park Road
MILWAUKEE 2,
735 N. Water Street

NEW YORK 2,
30 Church Street
PHILADELPHIA 8,
Broad St. Station Bldg.
PITTSBURGH 22,
Oliver Building
SALT LAKE CITY 1,
101 W. 2nd South St.
ST. LOUIS 1,
Railway Exchange Bldg.
SCRANTON 1,
122 Adams Avenue

SERVICE STATIONS

PITTSBURGH
SCRANTON

BIRMINGHAM
HARLAN, KY.

MT. VERNON, ILL.
LOGAN AND BECKLEY, W. VA.

FOREIGN PLANTS

JEFFREY MANUFACTURING CO. LTD., Montreal, Quebec
BRITISH JEFFREY DIAMOND LTD., Wakefield, England
JEFFREY GALLION (PTY.) LTD., Johannesburg





▲ ▲ ▲ Illustrating a Jeffrey 20-ton locomotive hauling a trip of cars to preparation plant on a large coal property in West Virginia. Where there's coal there's Jeffrey equipment to mine, transport and prepare it for market.



"Best Transmission we ever had..."

So says Pierce Wright, head mechanic at Central Indiana Coal Company's Maid Marian Mine, Odon, Indiana.

Mr. Wright's words of wisdom refer to Fuller 5-A-920 Transmissions in five of Maid Marian's eight Fuller-equipped 25-ton Euclid bottom dump trucks hauling raw coal from the pit to the tipple . . . an average of 17 to 18 round trips per seven-hour day. Two additional 15-ton rear dump Euclids, also equipped with Model 5-A-920's, haul the refuse away from the preparation plant.

Five forward speeds, an overdrive in fifth, and one reverse are provided by the Fuller's Model 5-A-920, which is designed for straight and tractor-type trucks utilizing engines up to 920 inches. The application of either two or three-speed Fuller auxiliaries provides the widest opportunity for transmission of power, gear splitting and maximum vehicle speeds.

For maximum economy in weight and space . . . for short, easy shifts, specify Fuller. You'll agree that it's the best transmission you ever had.



FULLER MANUFACTURING COMPANY (Transmission Division), KALAMAZOO 13F, MICHIGAN
Unit Drop Forge Division, Milwaukee 1, Wis. • WESTERN DISTRICT OFFICE (SALES & SERVICE—BOTH DIVISIONS), 1060 E. 11th Street, Oakland 6, Calif.



NEW BWH COVER DEFIES "RUBBER EATERS" RESISTS OIL, GREASE, SUN AND ABRASION DAMAGE

Oil, grease, strong sunlight and abrasion are factors that can't be controlled in many industrial operations. Yet they are all "rubber eaters" that tend to break down covers on steam hose and to shorten its service.

BWH technologists sweated over the problem for many laboratory hours before they developed this new, die-hard, synthetic rubber cover for Concord #10 Steam Hose. This improved cover adds so much to steam hose life, nobody with an eye to operating expenses can afford to overlook it. Yet it costs no more than ordinary hose!

Here's what makes Concord #10 a good choice for hard jobs:

1. It has the same dependably strong heat- and oil-resistant tube that won fame for extra service in BWH Bull Dog Steam Hose.
2. It is fortified with braids of high-tensile steel wire which are heat and pressure resistant. Gives strength with extreme flexibility.
3. Asbestos braid assures perfect cover adhesion, includes new type static-conducting wire.

4. NEW cover is unharmed over longer periods by oil, grease and sunlight—resists abrasion and highest steam temperatures.

When you need EXTRA safe hose that prevents "burst" explosions, withstands working pressure to 200 lbs. and gives you more for your money, investigate Concord #10 with new abuse-resistant cover!

HAVE YOU A JOB WHERE STAMINA COUNTS?

Bring us your toughest problems...we're specialists in solving them. Consult your nearby BWB distributor or write us.

Another Quality Product of
BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in all Principal Cities

PLANT CAMBRIDGE, MASS., U.S.A. • P.O. BOX 1071, BOSTON 3, MASS.

More earth moved in less time!

Substitution of a bucket with an approximate capacity of 46 cu yds in the place of its original and smaller one has made this Hanna Coal Co. machine, at Georgetown No. 12 mine, Ohio, one of the largest in the world. It is electrically equipped throughout by General Electric. Amplidyne control has resulted in substantially increased production. Though working on a 24-hour schedule, the shovel has lost practically no time for electrical maintenance since it was first put into operation in December 1946. More than 2500 shovels and draglines have been equipped with electric drive by General Electric.



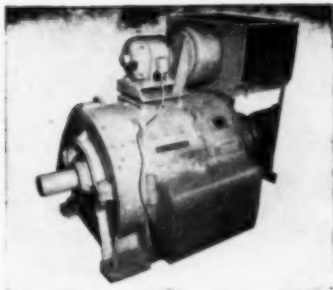
**AMPLIDYNE-CONTROLLED
SHOVEL DRIVES**

*— to cut stripping
costs per yard!*



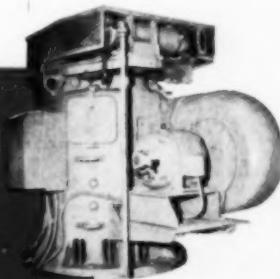


Hoist, swing, and crowd generators are driven by a G-E 1250-hp synchronous a-c motor (upper level). Shown on lower level is the power-factor amplidyne, exciter generator, and swing generator, all driven by a G-E 200-hp induction motor. The amplidyne synchronous motor field, says Mr. E. Gaston, electrical engineer of the Hanna Coal Company, maintains optimum power factor at full voltage, and reduces line losses to a minimum.



The huge bucket is raised and lowered by two G-E 425-hp MDP hoist motors, one of them shown here. Sturdy MDP motors incorporate such features as heavy steel frame to withstand severe service, dust-proof mountings for all bearings, improved banding and commutator design to permit operation at higher maximum safe speeds, and split frame to permit removal of top half for easy inspection of armature:

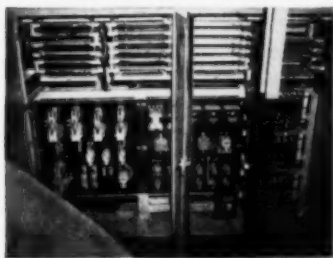
G-E amplidyne-controlled drive on Hanna Coal Company's giant stripping shovel provides faster hoist, swing, and crowd actions, works around the clock with minimum time lost for maintenance or repairs.



Swinging the shovel is the job of three G-E 125-hp MDV vertical swing motors (one shown at left). In addition to the main driving and control motors, some 30 auxiliary motors from 1- to 15-hp were furnished by G.E. for blowers, fans, oil pumps, steering, etc. Here an auxiliary Tri-Clad open dripproof motor drives the MDV motor's blower. Tri-Clad design and construction give three-way extra protection against physical damage, electrical breakdown, and operating wear and tear . . . proved by more than 1,500,000 Tri-Clads now in service.



Amplidyne control of hoist, swing, and crowd actions gives the operator instant shovel response. It provides faster acceleration and deceleration to cut seconds off each pass and increase daily yardage handled. The three G-E amplidyne shown control the three shovel motions precisely. Even at high speeds, they prevent the excessive current and torque peaks which might damage electrical and mechanical equipment.

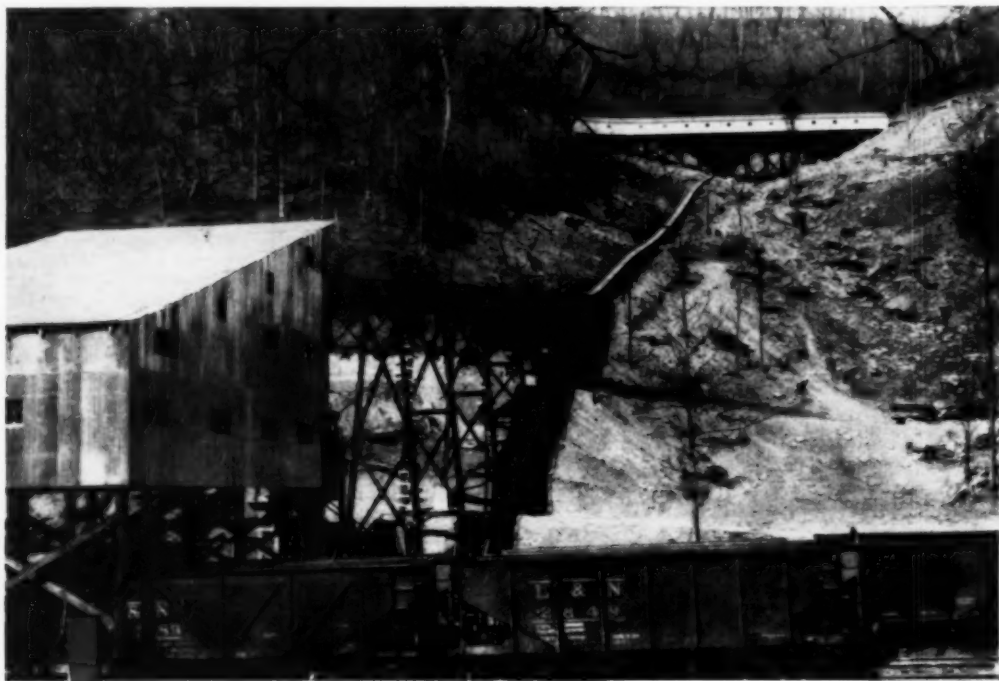


Simpler and more compact, the G-E amplidyne control panel shown uses fewer control devices, and takes up less space in crowded quarters. During the past six years, modern amplidyne control has been engineered into nearly all large shovels and draglines equipped by General Electric. For better results, make sure your shovels have G-E equipment throughout. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

GENERAL  **ELECTRIC**

This unified coal-handling

Hewitt-Robins "continuous flow" coal-handling system helps the Fourseam Coal Corporation keep pace with high-speed production



No coal-handling bottlenecks here!

The speed and modern efficiency of this "continuous flow" preparation plant makes routine of high production schedules.

It's the completely unified coal-handling system engineered by Hewitt-Robins for the Fourseam Coal Corporation at its Pine Mountain Mine, Leatherwood, Ky.

Coal is guided by a Robins Reciprocating Feeder to a 900-foot Hewitt-Robins De-

clined Belt Conveyor, equipped with Robins Rubberdisc Cushion Idlers at the loading point. The coal then moves down the mountain to the tippie at a speed of 450 feet per minute. And finally, it is guided through a double-deck Gyrex Screen for sizing before being loaded into waiting railroad cars.

This high-speed combination . . . designed, built and installed by Hewitt-Robins . . . has a capacity of 500 tons per hour!

HEWITT-ROBINS COMPLETE COAL-HANDLING SYSTEMS

system stops bottlenecks!



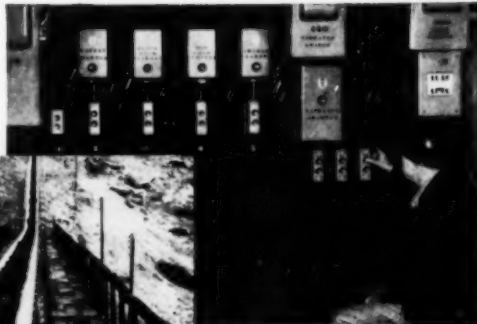
SIMULTANEOUS LOADING

by two picking-table boom conveyors. These conveyors, equipped with Hewitt Belting, reach to the very bottom of hopper cars. As coal level rises, booms also rise.



HEWITT-ROBINS DECLINED CONVEYOR

36" wide with 900' centers, leads coal by easy stages through a 142' drop to the tippie. Maximum slope is 17 degrees, minimum slopes 6 degrees.



PUSH-BUTTON CONTROL

—symbol of modern coal-handling and preparation efficiency—guides coal through each step of processing and loading into waiting railroad hopper cars for shipment.

Let Hewitt-Robins help you prevent coal-handling bottlenecks!

Whether you plan to modernize your mine completely or simply need to speed up a single operation, Hewitt-Robins stands ready to help you solve your coal-handling problems.

Remember, Hewitt-Robins is prepared to design, manufacture and install every element of your coal-handling system.

For underground mechanization, Hewitt-Robins offers you three standard types of Mine Conveyors—including machinery and belting—now

carried in stock in 26", 30", and 36" widths. So you can take immediate delivery from Charleston, West Virginia, or Passaic, New Jersey.

Whatever your need—idlers, screens, conveyor belts, conveyors, dewaterizers, or a complete coal-handling system—depend on Hewitt-Robins to help you speed your coal to market.

THESE DIVISIONS OF HEWITT-ROBINS SERVE THE COAL INDUSTRY:

HEWITT RUBBER DIVISION

Through the manufacture of water hose, air hose, water suction hose, fire hose, and coal conveyor belting.

ROBINS CONVEYORS DIVISION

Through the manufacture of conveyors, idlers, vibrating screens, cloth, dewaterizers, and two types of car shakeouts.

ROBINS ENGINEERS

By designing, furnishing and installing complete coal-handling systems including conveying and processing.

**HEWITT
ROBINS
INCORPORATED**

RUBBER DIVISION, BUFFALO 5, NEW YORK
CONVEYORS DIVISION, PASSAIC, NEW JERSEY
ENGINEERS, NEW YORK CITY 7, NEW YORK



YOUR MODERNIZATION'S COMPLETE

with new, heavy-duty mine cars

plus **FULLY AUTOMATIC**

YOU have to keep your new, large-capacity mine cars rolling to get out more coal at less cost. Old-fashioned link and pin couplings waste both time and man-power. To get full returns on your heavy investment in new equipment, you should complete your car modernization by installing O-B Automatic Couplers.

Here are the reasons why O-B Automatic Couplers can improve the over-all operating efficiency of your haulage system—and help you haul more coal for less money.

LESS MAINTENANCE...

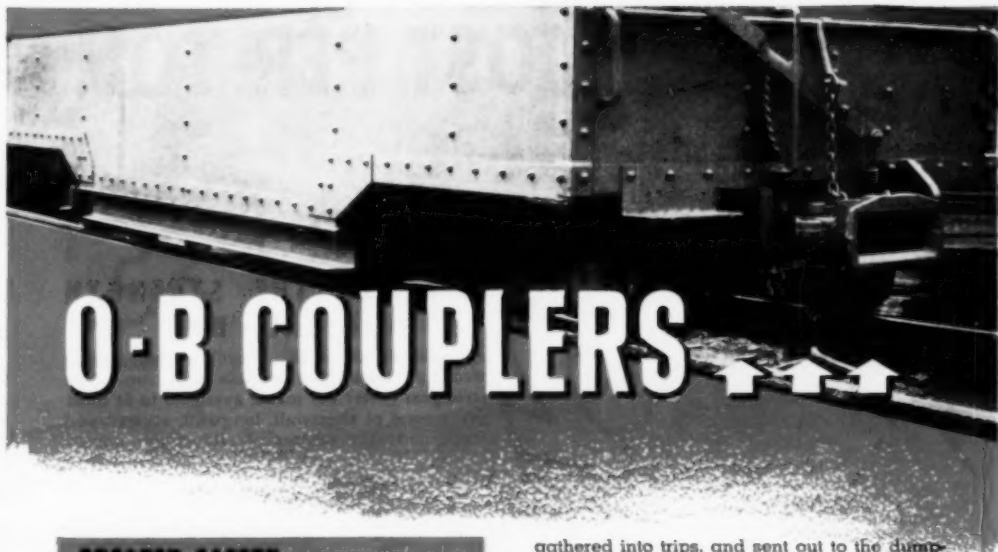
O-B Automatic Couplers remove practically

all dead slack from every trip. This eliminates car damage from jarring impacts and side strains which become increasingly severe as car weight goes up. Coupler-equipped cars spend little productive time in the repair shops for maintenance—they stay on the job.

INCREASED TRACK STABILITY...

Trips are kept in line on the track by the rigid steel-beam connections of O-B Couplers—permitting faster haulage speeds with little danger of derailments. The rubber draft gear of the Form-8 Coupler, with 100,000-lb. capacity, helps to keep the cars in the center of the track when pushing or buffing the trips.





GREATER SAFETY...

O-B Couplers eliminate the need for workmen to go between the cars for coupling or uncoupling. O-B's self-centering device brings the coupler heads to center position, making manual alignment of the couplers for positive connection unnecessary. The wide gathering range of the male and female design permits completely automatic coupling on all normal curves. Cars are easily uncoupled by a lever safely located at the side of the car.

FASTER OPERATION...

Cars can be brought in and out of the loading zone as soon as they are ready, quickly

gathered into trips, and sent out to the dumping point. The time saved on these operations means more time for hauling coal. O-B Couplers for rotary dumping cars can be equipped with a rotary head, making uncoupling unnecessary at the dump—more time saved.

BIGGER PAY LOAD...

Cars equipped with O-B Automatic Couplers can be filled to capacity—and reach the tipple still at capacity. Jolting and banging—causing the coal to bounce out of the car—is kept to a minimum by the smooth, even ride given by an O-B Coupler-equipped trip.

When you are ordering your new mine cars, specify the couplers that will bring maximum efficiency to your haulage system. O-B Automatic Couplers will complete your mine car modernization.

3023-AM


Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd.,
Niagara Falls, Ontario



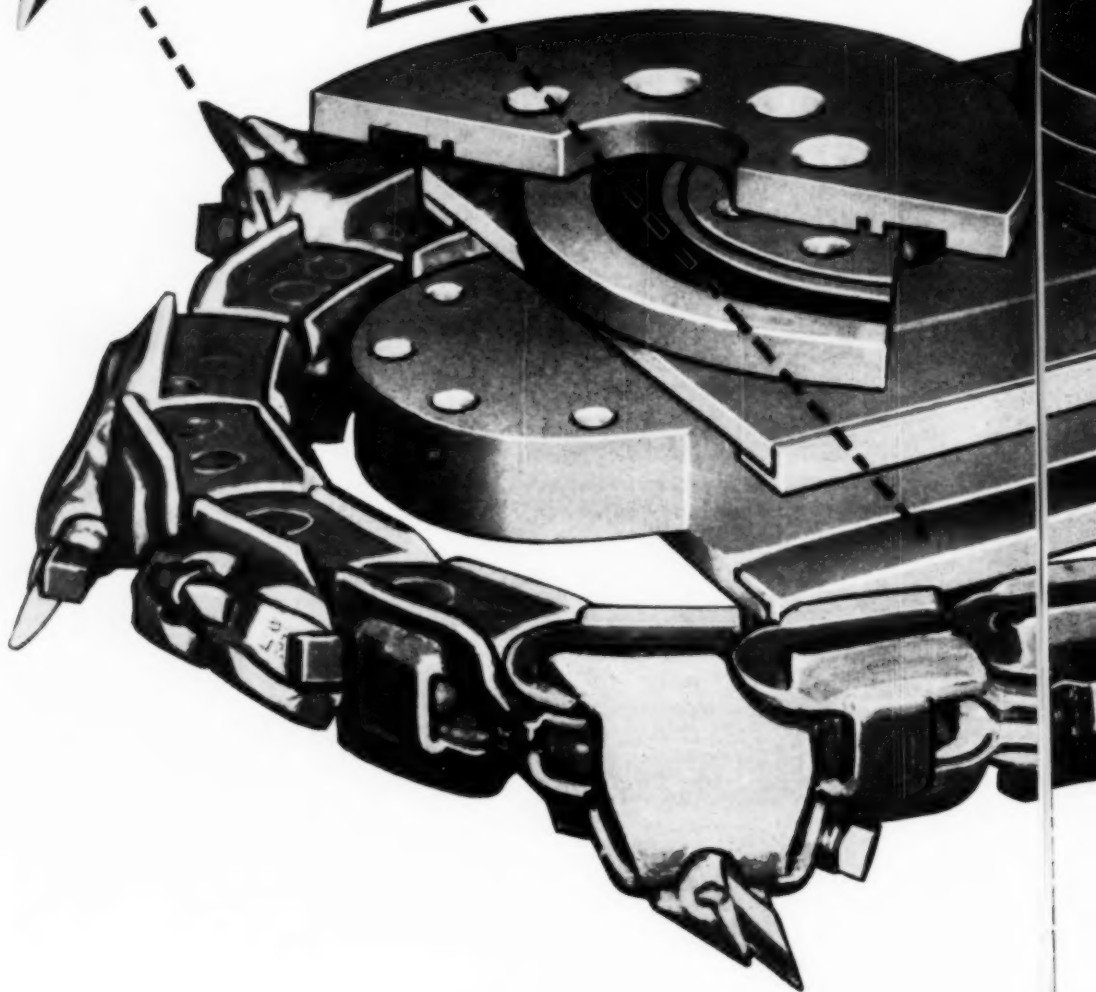
FOR LOWEST COST PER TON..



BOWDIL BITS save money in any cutting operation. So inexpensive, it doesn't pay to re-sharpen bits. Bowdil Bits use less power, give more profitable coarse cuttings. Many imitators . . . no equals.

LOOK AT THE STRENGTH OF THIS BAR

2 All welded construction, sturdy hardened angle wearing strips give wobble free run. The strongest cutter bar made, available to fit most every type of shortwall, longwall, arcwall and track cutting machines of all popular makes.




.. BETTER BUY BOWDIL!

3

LONGEST LASTING CHAIN IN THE COAL INDUSTRY!

Note the simple, secure rivet lock principle . . . and the shoulders on lugs and links that carry the load, lengthen chain life. One piece bit holder makes it easy and quick to change bits.



BOWDIL equipment has set the standard for coal cutting performance. The design and rugged construction has won the approval of operators everywhere. Write for complete information on the entire line of Bowdil products.

FIELD MEN AND REPRESENTATIVES IN Whitesburg, Kentucky; West Frankford, Ill.; Charleroi, Pa.; Denver, Colo.; Big Stone Gap, Va.; Williamson, W. Va.; Canton, Ohio; Birmingham, Ala.; Helper, Utah; Kansas City, Mo.; Centerville, Iowa; Topeka, Kansas; New Castle, England.

BOWDIL

COAL CUTTING EQUIPMENT
CANTON, OHIO



COAL WASHING PUMP EXPERIENCE PROVES

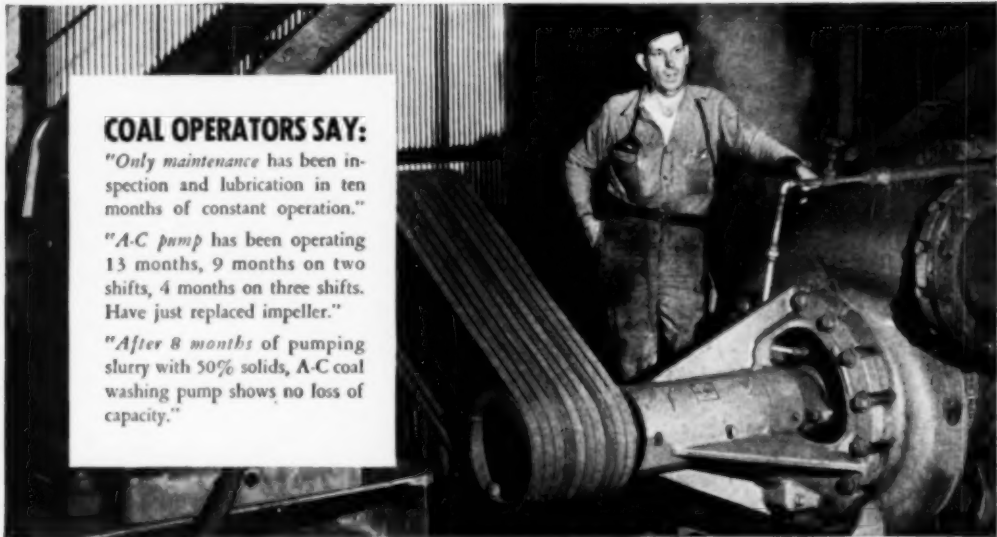
Long Parts Life!

COAL OPERATORS SAY:

"Only maintenance has been inspection and lubrication in ten months of constant operation."

"A-C pump has been operating 13 months, 9 months on two shifts, 4 months on three shifts. Have just replaced impeller."

"After 8 months of pumping slurry with 50% solids, A-C coal washing pump shows no loss of capacity."



REPLACE WORN PARTS IN HALF HOUR

YOU CAN GET the two things that coal operators want most in coal washing pumps from Allis-Chalmers solids-handling pumps. They give you longer life between servicings and they make it easy and economical to replace parts.

Allis-Chalmers coal washing pumps are designed with extra strong parts, built of *Allisite*, a special abrasion-resistant alloy, and application-engineered by experts with many years of experience in coal washing problems.

SAVES ON REPAIR TIME

When parts must be replaced, as they must in all types of coal washing pumps, the Allis-Chalmers coal washing pump will save you hours of labor, cut down-time to a minimum and lower repair costs.

This pump can be dismantled and reassembled in a half hour without disturbing piping. Parts with varying rates of wear are separated. Only those actually worn are replaced. Three sets of bearings, brackets and shafts cover all pump sizes, reducing parts inventory as much as 2/3.

ALLIS-CHALMERS, 968A SO. 70 ST.
MILWAUKEE, WIS.

GET THE FACTS

Discuss your coal washing equipment problems with an Allis-Chalmers pump engineer. He can show you dollars and cents savings you can make. Contact your A-C Sales Office today. Or write for Bulletin 6381.

A-2761

ONLY FIVE WEARING PARTS



Shaft sleeve, impeller, casing, two wear plates. All easy to handle and easy to replace. Pump can be dismantled or assembled in a half hour without disturbing piping.

Allisite is an Allis-Chalmers trademark.



ALLIS-CHALMERS



WHEN TO SPECIFY

I.W.R.C.

(INDEPENDENT WIRE ROPE CORE)

Preformed
"Blue Center"
Wire Rope

PERFORMANCE-PROVEN IN MINING SERVICE

IN THE TOUGH SPOTS, rope with an Independent Wire Rope Core gives best and longest service! I.W.R.C. is outstanding where operating pressures are high; where heat resistance, additional strength, or minimum stretch are essential. But remember this . . . the

same features that make I.W.R.C. best for the tough spots help make it the longest-performing and most economical choice for many applications!

In strip mining, for shovel hoist and draglines, Roebling Preformed "Blue Center" Wire Rope with I.W.R.C. is a

must for small and medium size equipment, and many operators prefer it on the larger 20- to 40-yard machines. For mining machines, the same rope in Regular Lay will give you outstanding performance.

Have your Roebling Field Man help select the *right* rope for your special requirements. John A. Roebling's Sons Company, Trenton 2, New Jersey.

— WRITE OR CALL THE ROEBLING FIELD MAN AT YOUR NEAREST —
ROEBLING OFFICE AND WAREHOUSE

Atlanta, 933 Avon Ave. ★ Boston, 51 Sleeper St. ★ Chicago, 5525 W. Roosevelt Rd. ★ Cleveland, 701 St. Clair Ave., N. E. ★ Denver, 1635 17th St. ★ Houston, 6216 Navigation Blvd. ★ Los Angeles, 216 S. Alameda St. ★ New York, 19 Rector St. ★ Philadelphia, 12 S. 12th St. ★ Pittsburgh, 855 W. North Ave. ★ Portland, Ore., 1032 N. W. 11th Ave. ★ San Francisco, 1740 17th St. ★ Seattle, 909 First Ave.

ROEBLING

☆ A CENTURY OF CONFIDENCE ☆

**In Two Minutes You Can See
Exactly How...**

The Concave Side

(U.S. Patent No. 1813698)

SAVES Your Transmission DOLLARS



You can actually feel
the sides of a belt change shape
as the belt bends.

Take any V-belt in your hands and bend it as it bends in going around a pulley. You will see that the top of the belt, being under *tension*, grows *narrower*. The body, under compression, *widens*. The sides *bulge out*.

This shape change—in a *straight-sided* V-belt—is shown in Figures 1 and 1-A, below.



Fig 1
Straight-Sided V-Belt



Fig 1-A
How Straight-Sided V-Belt
Bulges in Sheave-Groove.

Now look at Figures 2 and 2-A. There you see how the *same shape change* affects the V-belt built with the precisely engineered *Concave Side* (U.S. Patent No. 1813698).



Fig 2
Gates Vulco Rope
with Concave Side.



Fig 2-A
No Side Bulge.
Precise Fit in Sheave Groove.

The top of the belt narrows, the body widens. But the sides *merely straighten*—and the new shape *exactly fits* the sheave groove!

Two savings result. (1) Uniform side-wall wear—*longer life!* (2) Full side-wall grip on the pulley carries heavier loads and *sudden load increases* without slipping; saves belts, saves power!



Gates
MADE IN U.S.A.
The Mark of SPECIALIZED Research

**The Concave Side is
MORE IMPORTANT NOW Than Ever Before**

Because the sides of a V-Belt are what actually drive the pulley, it is clear that any increased load on the belt means a heavier load that must be transmitted to the pulley directly through the belt's sidewalls.

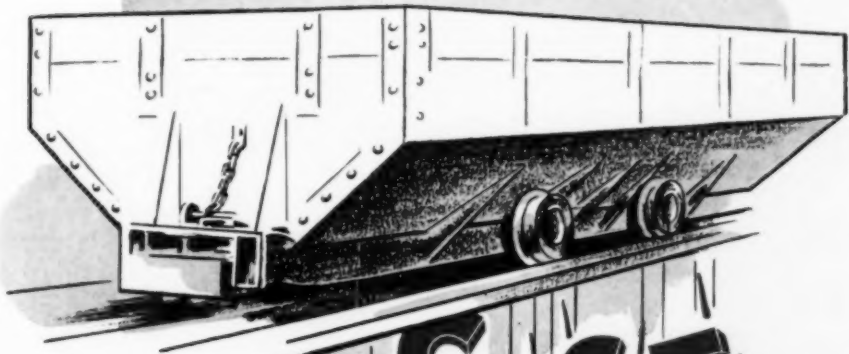
Now that Gates SPECIALIZED Research has made available to you SUPER Vulco Ropes—carrying fully 40% higher horsepower ratings—the life-prolonging Concave Side is naturally more important in conserving belt life today than ever before.

4910

GATES VULCO DRIVES
Engineering Offices and Jobber Stocks IN ALL INDUSTRIAL CENTERS
of the U.S. and 71 Foreign Countries

THE GATES RUBBER COMPANY
DENVER, U.S.A.
The World's Largest Makers of V-Belts

DROP-BOTTOM CARS



will drop your

COSTS

Cut the *idle time* of your loaders. A.C.F. Drop-Bottom Mine Cars eliminate waits and delays at the tippie. 'Lubricated' doors trip-and-unload, close-and-latch *while the trip is in motion!* One company empties a whole 14-car trip of 5-ton A.C.F. cars in just 70 seconds! Speed like that raises loading machine efficiency...lowers haulage costs...increases mine output.

Find out just how much time and money A.C.F. Drop-Bottom Cars can save. Call in our Sales Representative today.
American Car and Foundry Company,
New York · Chicago · Cleveland · Wash-
ington · Huntington, W. Va. · St. Louis
Berwick, Pa. · Pittsburgh · Philadelphia
San Francisco

A.C.F. MINE CARS

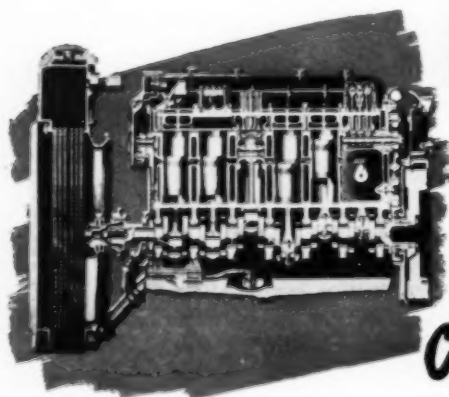
for Greater Coal Output

Do Your PISTON

...LOOK LIKE THIS?



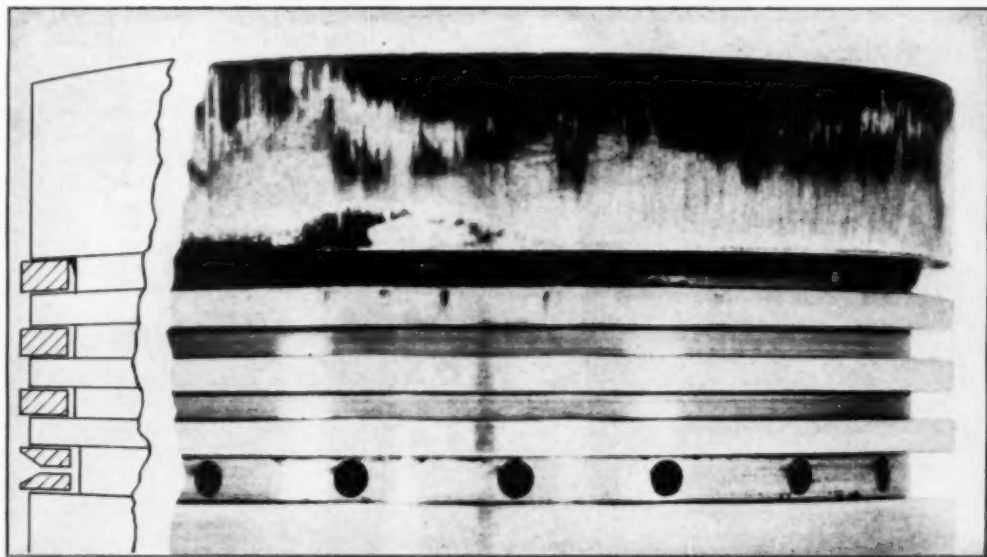
WITH REGULAR HEAVY DUTY OIL—This photo of an actual piston shows a typical example of what happens to piston ring grooves under **SEVERE DUTY** service when regular Heavy Duty 2-104B motor oil is used. The drawing helps to clarify the condition shown in the unretouched photograph. Note the heavy deposits that coat all surfaces.



**NEW SINCLAIR
SUPER TENOL
CUTS MAINTENANCE
COSTS IN SEVERE DUTY
SERVICE**

RING GROOVES

...OR LIKE THIS?



WITH NEW SUPER TENOL—This unretouched photo and drawing show how new Sinclair SUPER TENOL, in the same type of SEVERE DUTY service, cleaned out all but a small portion of the deposits shown at left. SUPER TENOL also quickly relieves valve sticking conditions, safely removes accumulated sludge and varnish deposits.

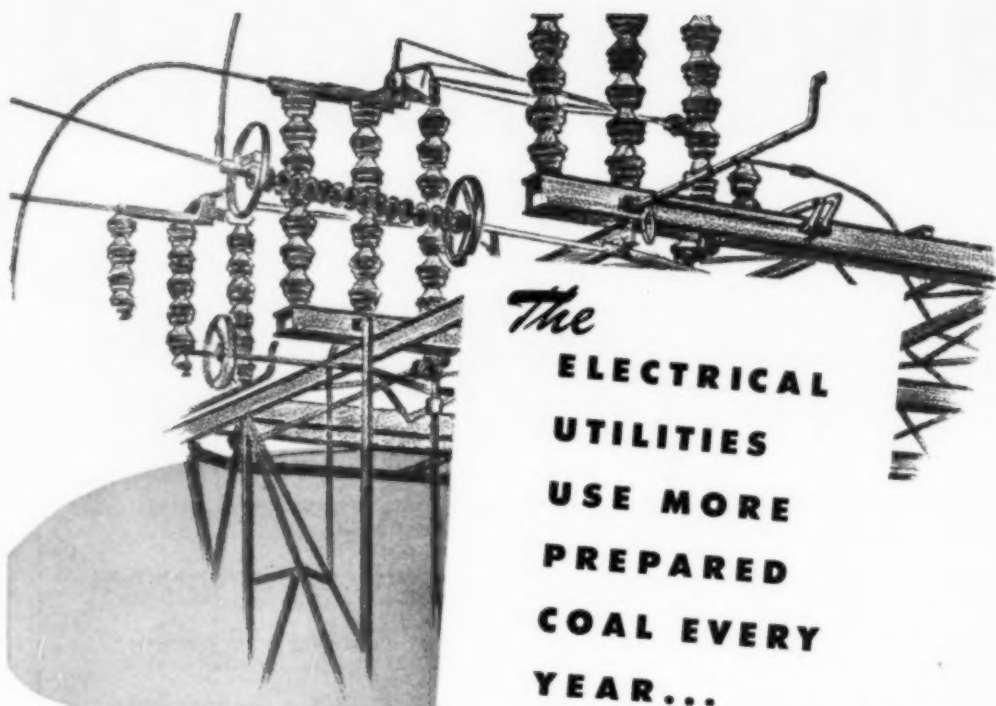
New, Sinclair SUPER TENOL has been specially developed to eliminate the high maintenance costs so frequently encountered in both types of SEVERE DUTY service:—1. High temperature, high speed, overload; and 2. Low temperature, light load, long idle, stop-and-go.

If you operate diesel-powered or gasoline equipment in either type of SEVERE DUTY service it will pay you to begin using new SUPER TENOL now—to keep equipment in operation many more days each year, to save time, labor and money.

SINCLAIR

HEAVY DUTY LUBRICANTS

Your Nearest Supplier of Sinclair Products Will Gladly Arrange Lubrication Counsel or You May Write to
SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.



Electric utilities in the United States used over 89 million tons of coal during 1947. This figure rose to 94.7 million tons in 1948—and estimates based on expansion now in progress show that annual requirements of the electric utilities industry will pass the hundred million ton mark.

DOES YOUR COAL QUALIFY FOR THIS GROWING MARKET?



FAIRMONT, located in the heart of the Appalachian coal fields, "lives with coal."



A large percentage of these millions of tons of coal must, of absolute necessity, be scientifically *prepared* coal. Smart planners will take steps now to make sure of a favorable position in this profitable market. If you'd like the advice of experts on preparation methods and equipment best suited to your coal, call on the FAIRMONT ENGINEERS. FAIRMONT designs and builds complete coal preparation systems . . . Chance Sand Flotation Process for Wet Cleaning and American Pneumatic Separator for Dry Cleaning.

FAIRMONT MACHINERY COMPANY

FAIRMONT, WEST VIRGINIA

Designers and Constructors of Chance Sand Flotation Process for Wet Cleaning and American Pneumatic Separator for Dry Cleaning

Dawn of a New Day
for COAL

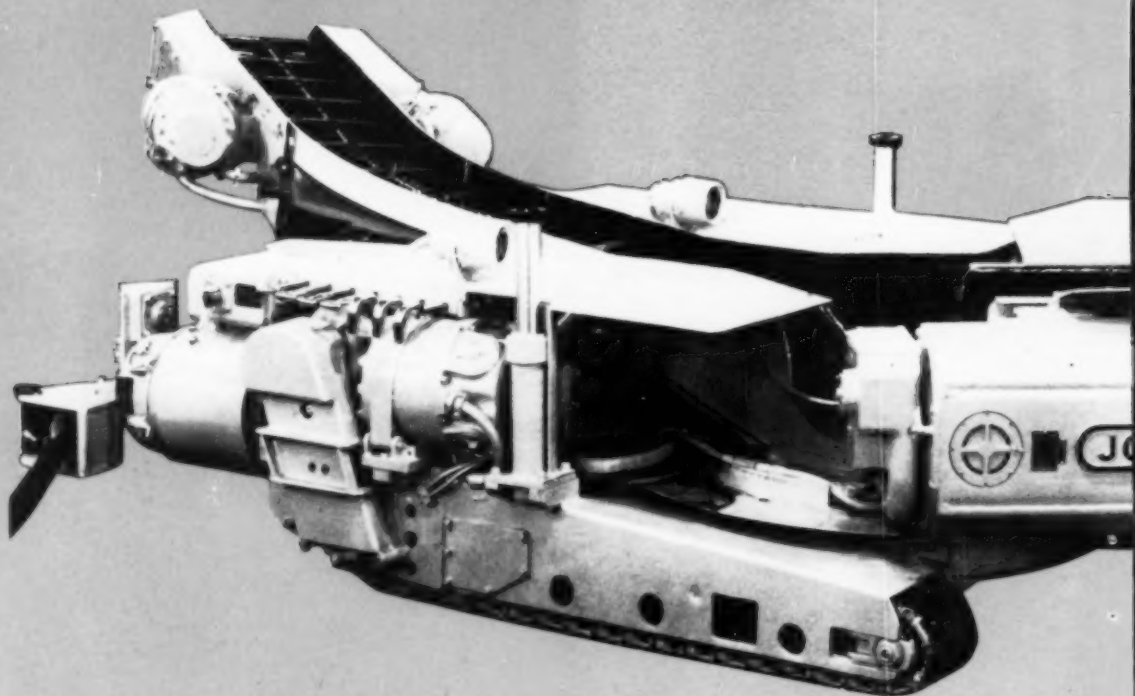
JOY



CONTINUOUS MINING

as developed by

JOY

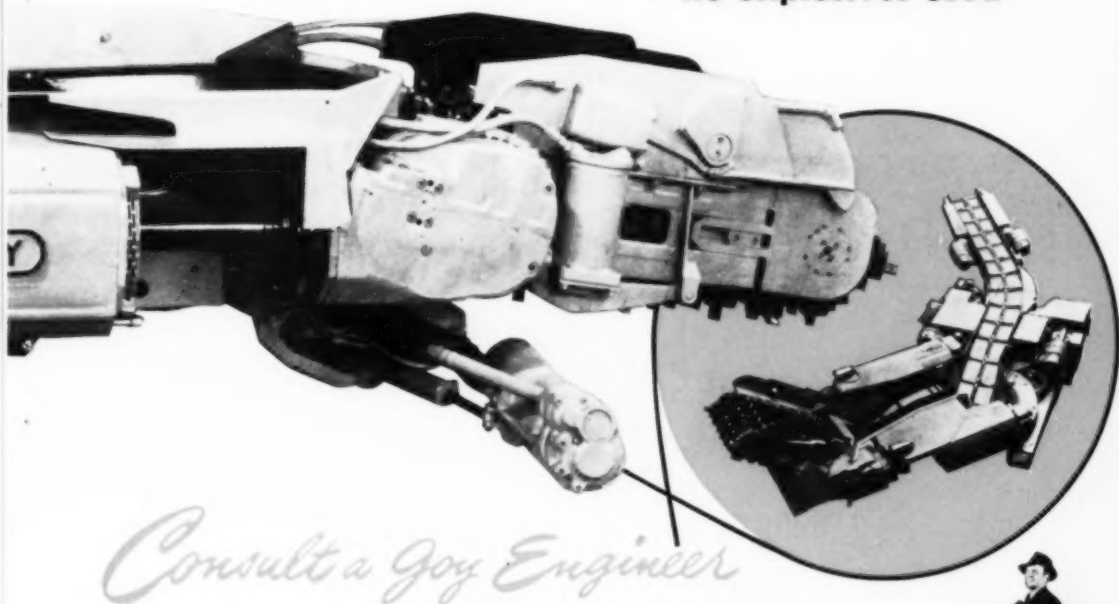


Built and Field-Proved

in two models: FOR HIGH AND LOW COAL

What you can DO with the **JOY CONTINUOUS MINER**

- ★ You can use it in any mine that the machine will enter
- ★ You can mine a seam as low as 42" or as high as 100"
- ★ You can handle split seams
- ★ You can vastly increase tonnage and reduce overall mining costs
- ★ You can get your coal without shooting
—no explosives used

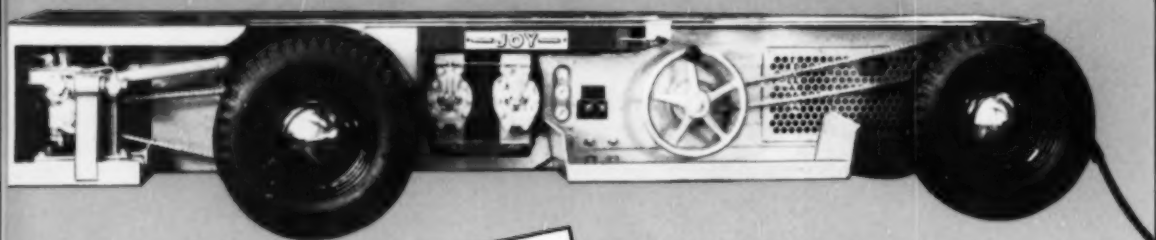


JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING • PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO





**TYPE WK-83 . . . TRACKLESS
SELF-PROPELLED—30" TO 34" HIGH**

JOY MINE-AIR COMPRESSORS are available in rubber-tire and track models, either self-propelled or draw-bar types, and in permissible units. Compressors are highly efficient, two-stage, single-acting, air-cooled—built in 130, 173, or 240 CFM sizes.

JOY

MINE-AIR COMPRESSORS AND DRILLS

*DO YOUR ROOF-BOLTING JOB
BEST and FASTEST!*



**YOU CAN DRILL A HOLE
AS DEEP AS YOUR COAL**

JOY STOPER DRILLS include a complete range of sizes down to 21" high. They do the entire roof bolting job: drill the hole, drive the bolt and wedge, and tighten the nut with an exclusive built-in torque wrench. They're the only drills that can drill a hole in the roof as deep as the thickness of your coal seam.

Write for Bulletins, or

Consult a Joy Engineer

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING • PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

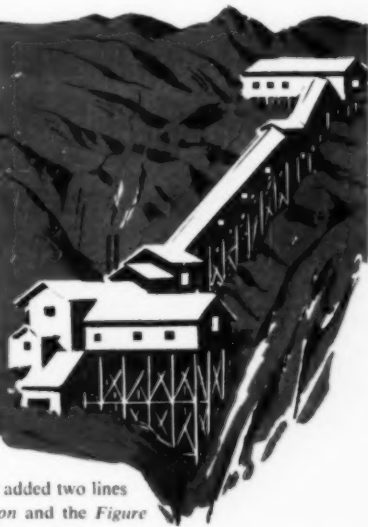


The era of pump specialization in your industry has, relatively speaking, just begun. Using the right pump for the right job is easier today than it was ten—or twenty years ago.

BJ helps you make the right choice by offering a specialized line of centrifugal pumps designed for mine applications. Once considered a hydraulic impossibility, BJ perfected the unique Hydopress Pump . . . a high pressure, low capacity, vertical centrifugal pump for heads as high as 7000 feet. BJ pioneered the Deepwell Turbine Pump and also developed the exclusive Submersible . . . a deep well pump close-coupled to a mercury-sealed motor. The entire motor-pump unit operates completely submerged.

For many years, BJ single and multistage horizontal centrifugal pumps were widely used as station, booster, and unwatering pumps. Due to the nature of their hydraulic design, small sizes are relatively

here's a frank statement about mine pumping that concerns you



ASK FOR THE FREE MINING BULLETIN

See how BJ Pumps handle special jobs in mining operations throughout the world.

Submersible	Bilt-on
Deepwell Turbine	Vertical Sinker Type Bilt-on
Vertical Sinker Type	Figure 1025 & 1050
Deepwell Turbine	Sand and Gravel
SD Multiplex	Pneumatic Sponge
SDO Multiplex	Hydropress
OL Multiplex	Hydroplex
Vertical Sinker Type Multiplex	Corrosion Acid
Type S	VMT
Vertical Sinker Type S	Antimonial Lead Acid

expensive. To fill the gap, BJ added two lines of small pumps . . . the Bilt-on and the Figure Pumps. Figure Pumps cover the single stage requirements. Bilt-ons are available in both single and two-stage construction. These smaller pumps are compact units priced in proportion to the pumping operation.

BJ Pumps can be furnished with materials to suit your mine conditions. Special metals, special impeller designs, and stout construction are part of the BJ Pump designs that best suit your applications. If you want extra technical help, consult BJ engineers. Their help is available to you at no obligation for preliminary consultation. For complete information, contact your local Byron Jackson representative or write for illustrated bulletins.

Byron Jackson Co.

Since 1872

LOS ANGELES 54, CALIFORNIA

Offices in Principal Cities

PLANTS: Los Angeles • Houston • Bethlehem • Fresno

Byron Jackson Co., 2301 E. Vernon Ave.
Los Angeles 54, California

Please send me your free mining bulletin.

Name.....
Company.....
Street.....
City..... State.....

Blast for This Road Without Damaging the House?

They Did It!

*By Controlling
Throw With the*

**ROCKMASTER
"16"
Blasting System!**



How's this for a tough blasting assignment? The A. B. Long Construction Co., widening a highway through Hunter, Tennessee, was faced with the job of blasting away 14 feet of rock bluff only 47 feet from a home and directly under a main powerline. Rock had to be broken small enough for a $\frac{3}{4}$ -yard shovel. Small blasts would cost too much in time and money. The shooting plan called for firing 174 holes at one time using 525 pounds of Atlas dynamite—depending on the Atlas ROCKMASTER "16" Blasting System to hold vibration and rock-throw to a minimum. Old hands at blasting said that the house was sure to be showered with rock fragments.

They were wrong! Once again, ROCKMASTER "16" did the "impossible"! Not a single rock touched the house or powerline . . . not a single window was even cracked! What is more, shovels moved right in after the blast: the finely broken rock, instead of being scattered all over the place, was in a neat pile almost exactly in its original position.

ROCKMASTER "16" can probably help solve *your* blasting problems—whether you blast rock, coal, or metal . . . on the surface or underground! Read how it's done in the new ROCKMASTER "16" booklet, which tells how this new blasting system, pioneered by Atlas, controls the timing between holes to thousandths of a second. Read how the proper choice of timing, loading, and explosives gives you far better control of breakage . . . saves drilling and dynamite . . . cuts down noise and vibration . . . controls throw as it never could be controlled before.

Write for your copy of the ROCKMASTER "16" booklet today and see for yourself how this latest Atlas development—featuring *sixteen* milli-second delay detonators—can help *you*!



ROCKMASTER "16" TIMINGS

Rockmaster No.	Avg. Time of Each Delay from Zero (milli-seconds)
0 (zero)	0 (inst.)
1	8
2	25
3	50
4	75
5	100
6	125
7	150
8	175
9	200
10	250
11	300
12	350
13	400
14	450
15	500
16	550

ROCKMASTER: Reg. U. S. Pat. Off.

ATLAS EXPLOSIVES
"Everything for Blasting"



ATLAS POWDER COMPANY, Wilmington 99, Del. • Offices in principal cities • Cable Address—Atpowco

NO CABLE LIKE IT!



**CUTS
SHORTS**

SECURITYFLEX *PARALLEL MINE CABLE* **with BREAKER-STRIP***

SECURITYFLEX *Safety Firsts*

- First to comply with U. S. Bureau of Mines Flame Test and Pennsylvania Flame Test. (Insist on mark of full compliance—P-102-BM—at 12" intervals.)
- First and only Anti-Short Breaker Strip* construction—cuts short circuits between conductors.
- First parallel mine cable with ground wire.
- First and only D-Shaped* insulation—prevents overriding of conductors.
- First to have insulation and outer jacket bonded together—to form a solid block around conductors.
- First with smaller diameters that pack more on a reel, ease handling.

*Reg. U. S. Pat. Off.

THE PATENTED anti-short breaker-strip construction of Securityflex Parallel Mine Cable is an exclusive development of Anaconda Wire & Cable Company. No other mine cable gives you this protection against shorts between conductors, even under the heaviest impact.

Breaker-Strip (available with or without ground wire) is only one of the many Securityflex features. Add up the advantages of Anaconda's specially compounded, extra tough neoprene jacket . . . non-kinking construction . . . improved heat-resisting synthetic rubber insulation . . . superior manufacturing techniques . . . the *Safety Firsts*.

Call your local Anaconda distributor (located in all principal cities) about Securityflex—the cable that takes a beating *and likes it!* Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

ANACONDA

Securityflex

MINE CABLE



Here's the Evidence
that Proves
WHITNEY
Universal
Mining Chains
Cut
Operating
Costs



UNIVERSAL JOINTS are constructed of steel forgings for toughness and workability. They are accurately machined for long life.



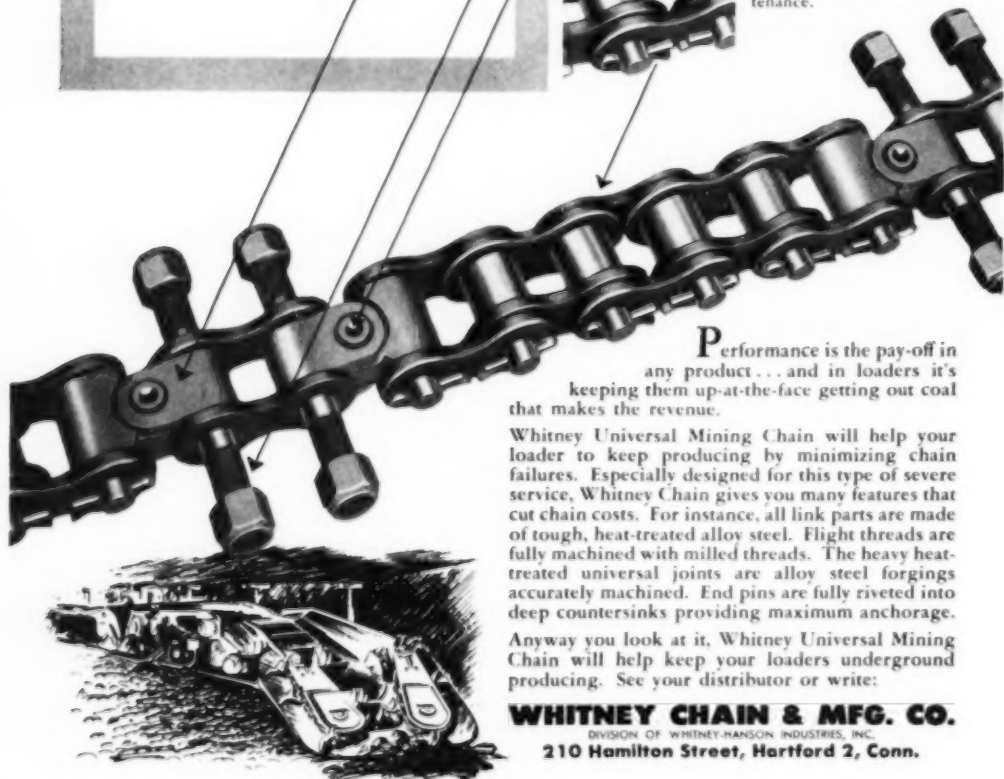
FLIGHT STUDS of alloy steel are fully machined and have milled threads. They are heat-treated for extreme toughness and durability.



END PINS of the universal joints are fully riveted into deep countersinks in the forgings, providing maximum anchorage under all operating conditions.



LINK PARTS — plates, pins, bushings and rolls — are precision made from heat-treated alloy steel stock assuring long operating life with minimum maintenance.



Performance is the pay-off in any product... and in loaders it's keeping them up-at-the-face getting out coal that makes the revenue.

Whitney Universal Mining Chain will help your loader to keep producing by minimizing chain failures. Especially designed for this type of severe service, Whitney Chain gives you many features that cut chain costs. For instance, all link parts are made of tough, heat-treated alloy steel. Flight threads are fully machined with milled threads. The heavy heat-treated universal joints are alloy steel forgings accurately machined. End pins are fully riveted into deep countersinks providing maximum anchorage. Anyway you look at it, Whitney Universal Mining Chain will help keep your loaders underground producing. See your distributor or write:

WHITNEY CHAIN & MFG. CO.

DIVISION OF WHITNEY-HANSON INDUSTRIES, INC.

210 Hamilton Street, Hartford 2, Conn.



EXTREME PRESSURE

All production machinery will last longer — give better service — if the proper lubricant is used. That's why you will find it profitable to use high quality Tycol oils and greases in your plant.

There's a reason! No matter what your lubricating need — *EXTREME PRESSURE, high or low temperature, high speed or any other service condition — there's a Tycol oil or grease suited to your specific requirements.

Refined from the highest grade crudes, Tycol lubricants are exceptionally resistant to breakdown which means greater economy . . . longer machine life for every type of equipment.

Tide Water Associated will gladly recommend the Tycol lubricant that meets your particular requirements. Call, write or wire your nearest Tide Water Associated office today.



Boston • Charlotte, N. C. • Pitts-
burgh • Philadelphia • Chicago
Detroit • Tulsa • Cleveland
San Francisco • Toronto, Canada



*LEARN WHAT THIS PRODUCT CHARACTERISTIC MEANS TO YOU — READ "LUBRICANIA"
This informative handbook, "Tide Water Associated Lubricania," gives clear, concise descriptions of the basic tests used to determine important properties of oils and greases. For your free copy, write to Tide Water Associated Oil Company, 17 Battery Place, New York 4, N. Y.

REFINERS AND MARKETERS OF VEEDOL — THE WORLD'S MOST FAMOUS MOTOR OIL



Want User Benefits in
Protection? Style? Comfort?

... THIS AO METAL SPECTACLE GOGGLE HAS THEM ALL!

Yes, the AO F-3100 Metal Spectacle Goggle gives workers "all three" *plus* unobstructed view of the work! Specify this proved preventer of eye accidents (and their high costs). Side shields give added protection when there is also exposure to particles striking from the side. Your nearest MSA Representative can supply you.

FEATURES:

- High-set end pieces take hinges and temples out of line of sight for unobstructed vision. High position of end pieces also keeps goggles up on nose for smart appearance.
- Double-braced bridge for exceptional structural strength.
- Orbit shape of lenses conforms to eye. Close fitting frame for maximum protection.
- Universal pivot support permits nose pads to adjust to sides of nose. Large size pads distribute pressure over greater area for comfort.
- Temples are insulated, perspiration proof, heat resistant.
- Side shields (when specified) are perforated, wire mesh, non-corrosive, easily cleaned and provide ample air circulation.

- Six Curve Super Armorplate clear or Calobar lenses in medium, dark or extra dark shades.
- Sizes: 42 mm., 44 mm., and 47.7 mm.; 21, 23, and 25 mm. bridge sizes.

American Optical
SAFETY PRODUCTS DIVISION

Southbridge, Massachusetts • Branches in Principal Cities

FORMEX[®]
Magnet Wires

DELTABESTON[®]
Magnet Wires

2 great magnet wires from a single source

TO FILL EVERY WINDING NEED

To provide a full range of sizes, shapes, and insulations . . . for a wide variety of applications . . . General Electric offers two great names in magnet wires—Formex, for temperatures to 105 C; and Deltabeston, for temperatures to 125 C.

Formex is a tough, workable magnet wire—insulated with synthetic resin — that is famous for speedy winding and extremely long operating life. Chemical-resistant, heat-shock-resistant, abrasion-resistant, small-diameter Formex magnet wires are available in all common sizes and shapes.

Deltabeston magnet wires, insulated with glass or with asbestos, are high-heat magnet wires that permit operation at temperatures higher than those allowable for ordinary cotton- or enamel-insulated wires. Deltabeston magnet wires are available in all the usual sizes and shapes.

Contact your G-E construction materials representative or distributor for detailed information about this complete magnet wire line. For the latest booklet on General Electric magnet wires, write to Section W40-1114, Construction Materials Department, General Electric Company, Bridgeport 2, Connecticut.



**GENERAL
ELECTRIC**

IN ANYBODY'S LANGUAGE-



Bethlehem Wire Rope Means Low Cost Per Unit of Work

In country after country all over the world Bethlehem wire rope has consistently proved its basic economy. Reason: its long life in service, which means low cost per unit of work—the only true yardstick of rope costs.

Every wire rope will do a certain amount of work, and it is often possible to record this in terms of definite units. That is, throughout its life the rope will move so many cubic yards of rock, or haul so many loaded cars up a hill, or lift and lower so many tons of drill pipe through varying distances, etc. Obviously, the rope cost should not be measured by purchase price alone, but by the cost of each unit of service the rope gives you.

In other words, the rope with the low price tag may look like a bargain, yet render such limited service that the cost per unit of work is high. On the other hand, a quality rope—costing more at the time of purchase, perhaps—can be a *real* bargain because of the long-term, efficient job it does.

Bethlehem wire rope is a quality product, made by craftsmen in one of the world's finest mills. It is built to give the user *low* cost per unit of work . . . to give him his money's worth and more. You can buy it with confidence; use it with the knowledge that it will serve you long and well.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

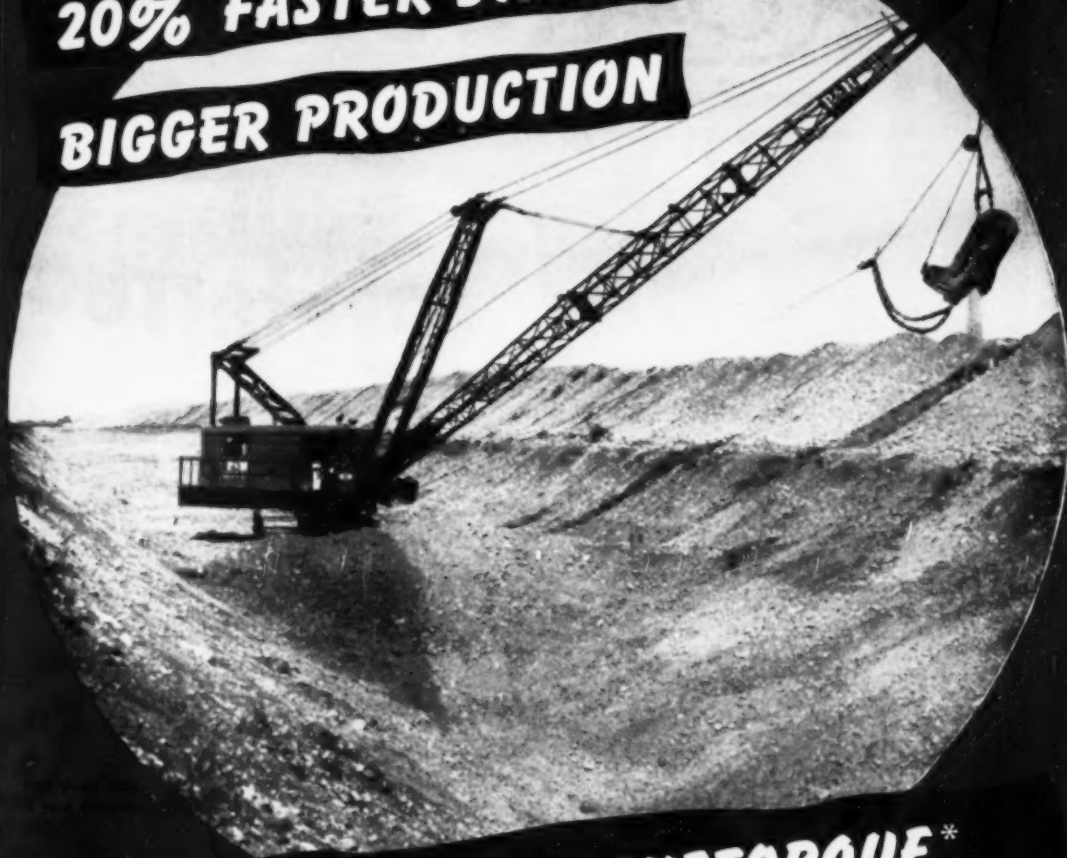


廉低用費 位單之功

Geringe Kosten per Arbeits-Ei

LOOK TO **P&H** FOR ADDED VALUES . . .

**20% FASTER SWING
BIGGER PRODUCTION**

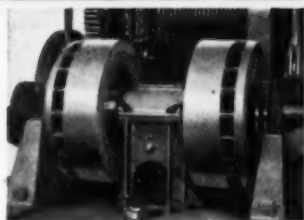


WITH P&H MAGNETORQUE*

With swing taking about 70% of the average digging cycle, figure what the P&H Magnetorque means to you in bigger production. With 20% faster swing, you can make 5 complete digging cycles to 4 on other machines.

Smoothness means easier operation — velvety starts and stops — far less strain on machinery and structural members.

There's all the difference in the world between conventional swing mechanism and the P&H Magnetorque. If you don't have the facts, it's to your advantage to get them. Write us.



The P&H Magnetorque unit eliminates the ordinary swing assembly and all its troubles — transmits power electro-magnetically without friction, without mechanical wear. The Magnetorque lasts the life of the machine. Write for Bulletin X-104.

*P.M. of Harnischfeger Corporation
for electro-magnetic type clutch.

CARDOX

NON-EXPLOSIVE MINING METHODS



Preferred

CARDOX AIRDOX



Performance records in mine after mine prove that when either CARDOX or AIRDOX replaces explosives a decrease of from 15% to 20% in minus 2" coal, and a very large decrease in minus $\frac{1}{4}$ " is assured. In addition, their mild action so reduces shattering that

degradation is greatly reduced in cleaning, shipping and storage, as well as at the face.

Recommendations as to whether CARDOX or AIRDOX will provide the most profit-building advantages for your mine will be made after examination by one of our engineers.

GET THE FULL STORY

Write today for complete information on profitable application of CARDOX, AIRDOX and CARDOX-HARDSOCK equipment to your operations.

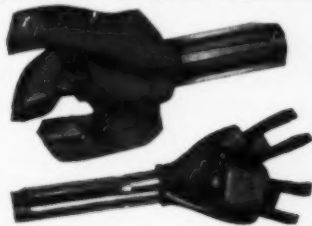
Because They Pay

COAL RECOVERY DRILL



Designed to salvage profitable tonnage where overburden removal has become too costly for further stripping. Cardox-Hardsocg Augers, available in diameters of 20" to 30", carry the coal in a continuous flow from the seam. Illustration above shows "hook-up" with portable conveyor for automatically loading trucks or cars.

CARDOX-HARDSOCG STANDARD DRILLING EQUIPMENT



The Cardox-Hardsocg line of proven drilling equipment features Carbide Tipped and Standard Cutterheads, Augers ranging from 2" to 8" in diameter, bits, wedges, thread-bars, sockets, boxing and boxing liners.

Cardox-Hardsocg Carbide Tipped Cutterheads are available with recessed core breaker as shown, or extended pilot, and with spline, square or hexagon connections.

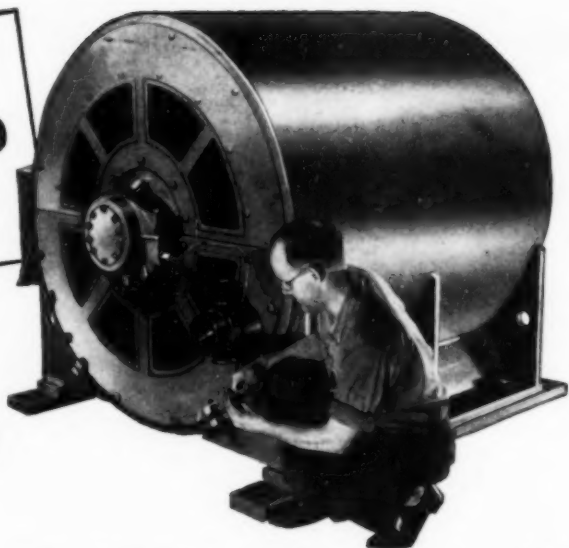
CARDOX CORPORATION

BELL BUILDING • CHICAGO 1, ILLINOIS

**TUBE-TYPE
TOTALLY-ENCLOSED
FAN-COOLED
MOTORS!**

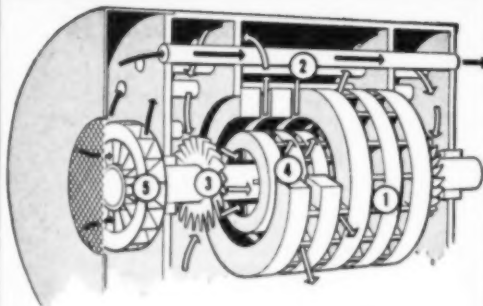
DIRT-

**AND CORROSION-
RESISTANT!**



PROOF!

How Tube Cooling Works



Stator core (1) is surrounded by tubes (2). Internal fans (3) circulate air through ducts (4) in rotor and stator and around tubes, transferring heat to tubes.

External fan (5) drives outside air through tubes, removing heat and keeping tubes clean. All electrical parts are enclosed. Dirt cannot enter.

*Totally-Enclosed Fan Cooled

- Install anywhere — indoors or out
- Heat exchanger is practically *self-cleaning*
- Sizes . . . 75 to several thousand horsepower

THIS ALLIS-CHALMERS tube-type TEFC* motor practically eliminates cleaning and other high maintenance costs associated with large motors exposed to dirty and corrosive atmospheres. And it does this with a simple, self-contained, tube-type, ventilating system.

All electrical parts — including the stator core — are enclosed. The simple heat transfer system keeps temperatures well within rated limits. Cleaning is rarely needed because air passages are unrestricted. Air flow through the straight tubes removes foreign matter.

Three years of field operation have proved important savings. Sizes from 75 hp and up. Also explosion-proof designs. For complete information, outline your requirements to your A-C Sales Office, or write for Bulletins 05B7150 and 51R7149.

A 2664

ALLIS-CHALMERS, 968A SO. 70 ST.
MILWAUKEE, WIS.



ALLIS-CHALMERS

THE TIGER BRAND SPECIALIST SAYS—

"Coal company records show Tiger Brand Wire Rope consistently handles most cubic yards"



"I visited a large coal company in Kansas recently and dug up some eye-opening figures showing a comparison of wire rope service. Here they are—

KANSAS: 14-yard shovel 1-5/8-inch rope		
	No. of Ropes	Average Cu. Yds. handled per rope
Tiger Brand 16		529,605
Brand A 4		486,614
Brand B 12		401,722
Brand C 4		436,353
Brand D 7		432,050

"This is not just an isolated case. Time after time where direct comparisons have been made of wire rope service life, Tiger Brand stands at the top of the list."

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA STEEL COMPANY, SAN FRANCISCO

TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM, SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

AMERICAN TIGER BRAND

WIRE ROPE



Excelsay Preformed



UNITED STATES STEEL

TIGER BRAND Wire Rope Specialists are interested in seeing that you get a full dollar's worth of performance out of every dollar you invest in wire rope. Most of their time is spent right out where the rope is used.

That's why these engineers are qualified to give you service that is both helpful and speedy. Besides helping you select the most practical wire rope, they can often give you valuable money-saving tips on operation. Ask one of these men to call.

SEND FOR FREE BOOKLET

American Steel & Wire Company
Rockefeller Building, Dept. J-119
Cleveland 13, Ohio

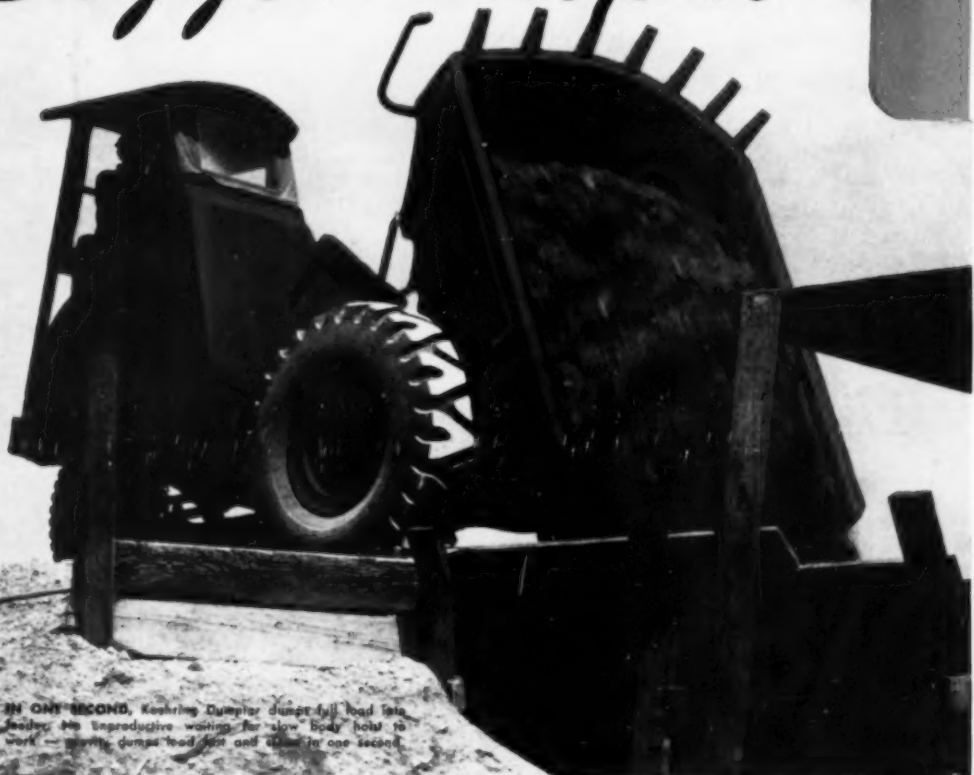
Please send me a copy of your booklet, "Valuable Facts . . . About The Use And Care of Wire Rope."

Name.....
Company.....
Address.....
City..... State.....



FOR

Bigger Output



IN ONE SECOND, Koehring Dumper dumps full load into feeder. No unproductive waiting for slow body hold to work — moving dense load fast and clean in one second.



STEEP GRADES—Ability to pull full loads up grades to 24% make Dumpers especially suitable for heavy hauling out of pits. Sturdy hydraulic brakes give complete control on steep down-hill runs. Parking brake is independent.



ROUGH HAUL ROADS don't slow up Dumpers. Ruts won't twist heavy-duty frame because steering axle oscillates as much as 21", takes the strains out of rough mine road travel. Big tires help cushion shocks, give better traction, flotation.



in mines, pits and quarries

KOEHRING DUMPTORS

load FASTER • haul FASTER • dump FASTER

ON typical, rough, off-road hauls, you can increase trips per hour, yardage per day and reduce maintenance problems with Koehring heavy-duty, 6-yard Dumptors. Here's why:

Short Turning Radius, Big Target SAVE SPOT AND LOAD TIME

Short, 19'6" turning radius and compact design let Dumptor get close in under shovel . . . save jockeying back and forth. Big, 64 square-foot body opening provides an easy-to-hit target. Result—increased shovel production, more haul-time, less spot and load time.

Heavy-Duty 6-Yard Body BUILT FOR HEAVY ROCK SERVICE

To take severest shocks of shovel-loading, all-welded Dumptor bodies are heavily ribbed with 4" channels. Bottom of seasoned 1-3/8" oak timbers, between two 5/16" steel plates, cushions load shocks. In heavy mine and quarry service, Dumptors give you less down-time, more work-time, year in, year out with less maintenance care.

Ton of Strength per Ton of Payload SPEEDS TRAVEL ON ROUGH HAULS

Koehring Dumptors have rugged 8" ship channel main frame, heavily trussed . . . 4" chrome steel drive axles . . . cast alloy-steel "I" beam steering axle, that take the twists and strains of fast off-road travel. Big rugged

tires take road shocks. There are no leaf springs . . . Dumptor needs only one big double-coil spring, on steering axle. You have NO spring maintenance.

6 HP for Every Ton of Gross Weight GIVES GREATER GRADE-ABILITY

Dumptor has 6 HP for every ton of gross vehicle weight. That means more "GO," more acceleration, less shifting on grades. Also, plenty of power to climb grades to 24% with full load. Dumptors are built to stand up under the toughest hauling of mine and quarry service.

No Slow, Troublesome Body Hoists . . . DUMPTOR DUMPS IN ONE SECOND

At the dump, gravity dumps load . . . fast. One second and body is empty . . . you're on the way for another load. You save 15 to 25 seconds every dump. No mechanical complications . . . no body hoist maintenance. Free-swinging kick-out pan breaks suction of sticky materials . . . adds 3/16" of steel to strength of Dumptor bottom.

No-Turn Shuttle Operation SAVES SLOW TURNS EVERY TRIP

Because Koehring constant-mesh transmission makes same 3 speeds available in both directions, Dumptors are never turned on shuttle hauls. On a 1,000' haul (16 round trips per hour), this gains 8 minutes every hour. Let your Koehring distributor show you what Dumptors can do to save money in your mine, pit or quarry.



Koehring 605 Rock Shovel Keeps Pace with Fast Dumptor Hauling Speed . . .

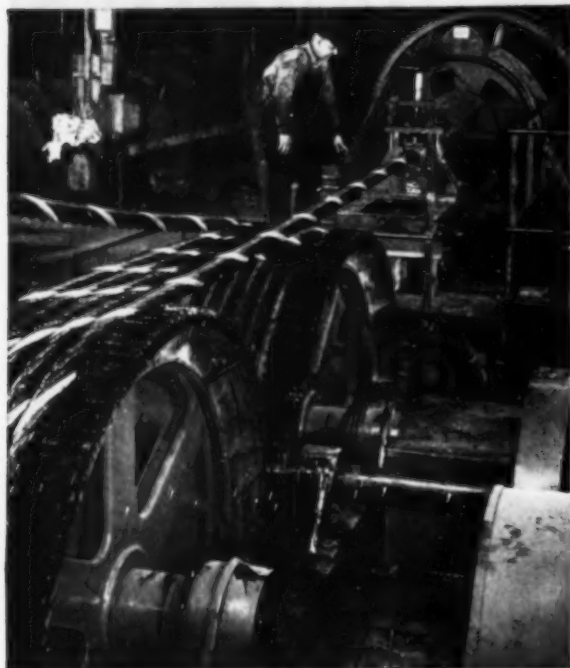
For balanced, high-production teamwork on both your excavating and hauling operations, team up your Dumptors with the Koehring heavy-duty 605 Rock Shovel. Its fast operating speeds . . . big 1 1/2-yard dipper capacity . . . rugged, extra strong boom, with shock-absorber mount . . . and big, power-operated clutches, all keep production high, costs low. Your Koehring distributor also can show you heavy-duty Koehring excavators in 1/2-yard, 3/4-yard, 2 1/2-yard sizes to satisfy your exact requirements.

KOEHRING

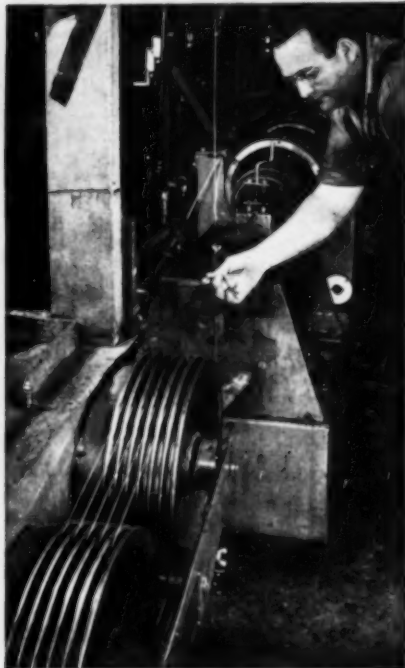
COMPANY, Milwaukee 10, Wisconsin

Subsidiaries: JOHNSON • KWIK-MIX • PARSONS

This photograph shows a 3 1/8" diameter Monarch Whyte Strand Wire Rope coming off a Macwhyte closing machine. Weight of this rope is approximately 16.65 pounds per foot. It has a strength of approximately 392 tons and is used for the digging line on large drag-line excavator with 35 cu. yd. bucket.



In this photograph is a 3/4" diameter Stainless Steel Cord coming off a Macwhyte closing machine. It weighs approximately 0.35 lbs. per 100 feet; has a strength of approximately 270 pounds, and is used for many small cord needs.



Whether you need

LARGE WIRE ROPE or SMALL WIRE CORD

You will get smoother operation and better service when you use the wire rope designed and manufactured to meet your requirements.

Macwhyte engineers are always glad to suggest the correct Macwhyte rope or cord best suited to your needs.

Just drop a card or letter to Macwhyte Company or your Macwhyte distributor.

MACWHYTE COMPANY

2931 Fourteenth Avenue Kenosha, Wisconsin

Manufacturers of Monarch Whyte Strand *PRE*formed, Internally Lubricated Wire Rope, Atlas Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal and Stainless Steel Wire Rope.

Mill Depots: New York • Pittsburgh • Chicago
Minneapolis • Fort Worth • Portland • Seattle
San Francisco • Los Angeles

Catalog on request.

make your selection from

a thousand and one
WIRE ROPES
made by
MACWHYTE

EATON

2-Speed Truck

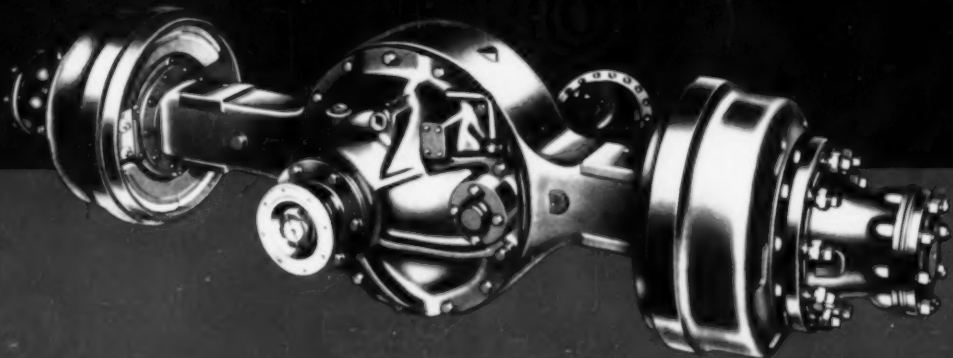
AXLES

Reduce Maintenance Costs—

Make Trucks Last Longer

*More Than a Million
Eaton 2-Speed Axles
in Trucks Today*

The exclusive features of Eaton 2-Speed Truck Axles assure extra service with freedom from repairs. Only Eaton Axles provide planetary gearing, which minimizes stress and wear because gear speeds are slower and gear loads are distributed over a number of teeth. Only Eaton Axles provide forced-flow oiling, which reduces friction because lubrication begins the instant the axle turns over. Only Eaton Axles provide a housing designed for abnormal service. Only Eaton Axles provide driving gears engineered for maximum durability. Ask your truck dealer to show you how Eaton Axles make available exactly the right gear ratio for every condition of road and load.



Axle Division
EATON MANUFACTURING COMPANY
CLEVELAND, OHIO



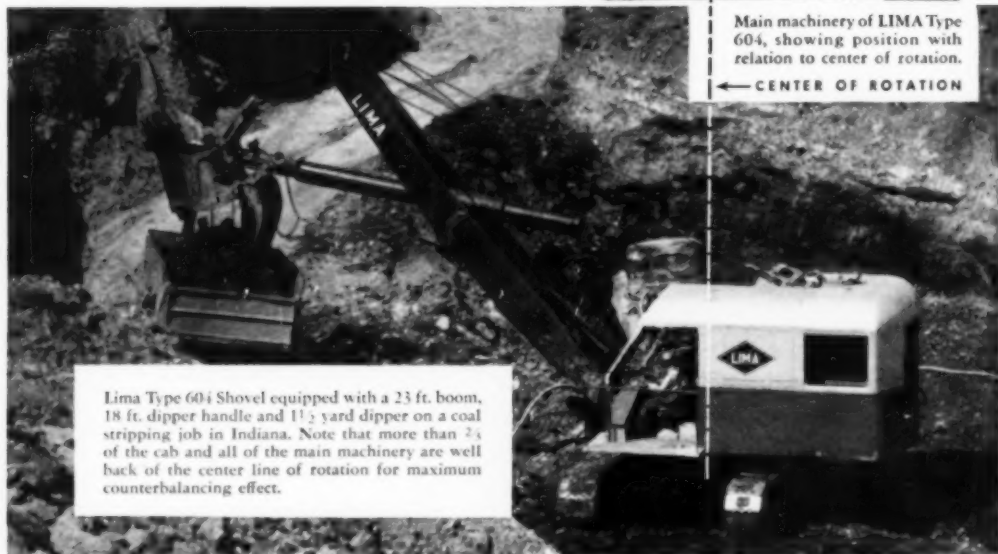
PRODUCTS: SODIUM COOLED, POPPET, AND FREE VALVES • TAPPETS • HYDRAULIC VALVE LIFTERS • VALVE SEAT INSERTS • ROTOR PUMPS • MOTOR TRUCK AXLES • PERMANENT MOLD GRAY IRON CASTINGS • HEATER-DEFROSTER UNITS • SNAP RINGS • SPRINGTITES • SPRING WASHERS • COLD DRAWN STEEL • STAMPINGS • LEAF AND COIL SPRINGS • DYNAMATIC DRIVES, BRAKES, DYNAMOMETERS

Why the **LIMA** Type 604 develops the greatest capacity per lb. of weight



Main machinery of LIMA Type 604, showing position with relation to center of rotation.

← CENTER OF ROTATION



Lima Type 604 Shovel equipped with a 23 ft. boom, 18 ft. dipper handle and 1 1/2 yard dipper on a coal stripping job in Indiana. Note that more than 2/3 of the cab and all of the main machinery are well back of the center line of rotation for maximum counterbalancing effect.

● The LIMA Type 604 shovel, crane and dragline is engineered to produce greatest capacity with minimum weight. This is achieved by placing as much weight as possible *behind* the center of rotation—eliminating the need for excessive counterweight. Hook rollers on which the machinery base revolves eliminate strain from the center pintle—permitting continuous, safe operation at full capacity.

The simple, compact design of the main machinery, using the fewest number of shafts to accomplish the various operations, further contributes to efficient, trouble-free service.

These are only a few of the features which make the LIMA 604 a favorite with owners and operators. The Lima Line includes shovels 1/4 to 6 yards, Cranes 13 to 110 tons and Draglines variable.

It will pay you to consult your nearest Lima Sales Office or representative before you buy your next shovel, crane or dragline. Offices in principal U.S. cities.

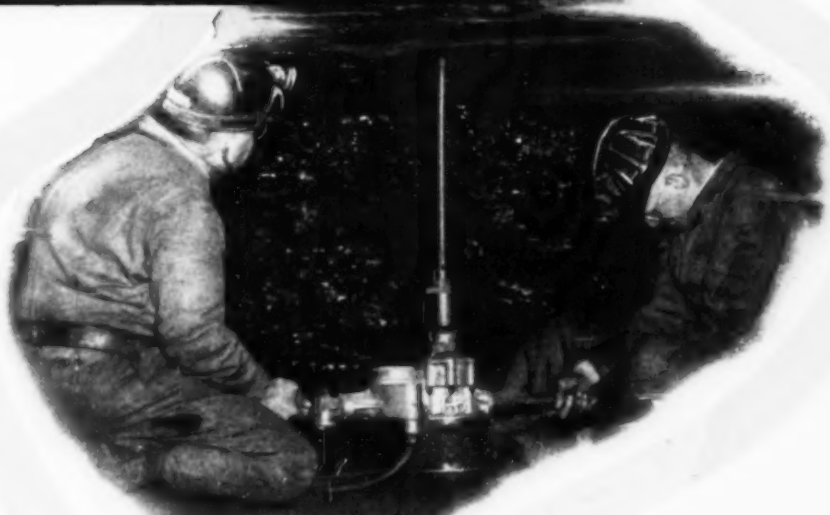
Lima Shovel and Crane Division

LIMA, OHIO

OTHER DIVISIONS: Lima Locomotive Works Division; Niles Tool Works Co.; Haoven, Owens, Rentschler Co.



Announcing...



The New Kennametal Bit for Pin Hole Drilling



Kennametal FD Bits have a hard, durable cutting edge of solid Kennametal cemented carbide... tough body construction for lasting service.

KENNAMETAL

Trade Mark Reg. U. S. Pat. Off.

DRILL BITS • MACHINE BITS • STRIP BITS • ROCK BITS

The new pin hole drilling bit developed by Kennametal gives you 10% to 20% faster drilling speed than pneumatic methods. It drills hard shale, hard slate, and laminated sandstone. Holes are drilled in single gage, saving drilling time and giving your expansion units full contact area.

You get maximum speed in drilling medium roof... make big savings on equipment cost and handling time.

Let the Kennametal representative near you tell you the complete story on the new Kennametal pin hole drilling bit! He can recommend, demonstrate, and give your problems the benefit of his specialized experience.

Mining Division, Kennametal Inc., Latrobe, Pa.

KENNAMETAL INC.,
Latrobe, Pa.

Send me a free copy of Bulletin M-105, describing your new pin hole drilling bit.

Name _____

Position _____

Company _____

Address _____

CLIP THIS
COUPON
— mail for
particulars
today!



Dick:
Recommend you order
track bolts and spikes
from Bethlehem. They
make the sizes we
need. Carry them
in stock, too.
B.F.



BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

*Other Bethlehem Fastenings
for the Mine*

RIVETS • THREADED RODS
MISCELLANEOUS SPECIAL FASTENINGS
STANDARD BOLTS AND NUTS

How to avoid application errors at the face:



use { **Gulf Mining Machine Lubricant B**
for lubrication - it does the job of 2 or 3 other lubricants
Gulf Journal Oil B
for hydraulic systems

With Gulf Mining Machine Lubricant B and Gulf Journal Oil B you can service almost any mining machine—and you eliminate as many as 4 oils and greases! Thus your lubricant storage and handling are greatly simplified and you avoid application errors at the face.

Gulf Mining Lubricant B and Gulf Journal Oil B not only do the job of several other oils and greases, but do it better! Gulf Mining Machine Lubricant B has a heavy body to insure less leakage from gear cases; exceptional adhesiveness that prevents throwoff or channeling; higher lubricating value that insures less wear; and it resists the washing action of water.

Gulf Journal Oil B gives outstanding protection to hydraulic pumps—helps maintain system efficiency!

Call in a Gulf Lubrication Engineer today and ask him to explain in detail how these two Gulf

quality products for cutting and loading machines can give you effective help in your efforts to increase tonnage and reduce costs. Write, wire, or phone your nearest Gulf Office.

Gulf makes available top quality passenger and truck tires — ask your Gulf representative

Gulf Oil Corporation • Gulf Refining Company

Division Sales Offices: Boston • New York • Philadelphia • Pittsburgh
Atlanta • New Orleans • Houston • Louisville • Toledo



PIPE

**Acid and Alkali
Resistant**

CARLON E FLEXIBLE PIPE

Proved Durable by Actual Test

*Two girls easily lift one
200 ft. coil of Carlon E
Pipe weighing only 100 lbs.
Easy to handle and install.*

Carlon Pipe has proved its superiority for two years under most severe acid water conditions in actual mine installations. Years of corrosion-free service, plus flexibility and toughness at all temperatures ranging from 50° below to 120° F. make Carlon Pipe the most useful pipe on the market. Lightness in weight,

long length coils and simple, efficient fittings save many dollars in installation and maintenance costs. It is impervious to practically all inorganic chemicals and completely free from any electrolytic corrosion—cannot form a galvanic couple! That it completely meets the requirements of mine operations, is proved by practical tests made by leading mining companies.

PROVES AMAZINGLY DURABLE UNDER SEVERE TESTS

For many months one of the country's largest mining companies has been making practical tests of Carlon E Pipe in several of its mines. Here are the reports:

Mine A—400 ft. of Carlon E Pipe in service 6 months show no signs of wear or effects from acid mine water.

Mine B—200 ft. of Carlon E Pipe in service 8 months—same report and superintendent estimates that if iron pipe had been used in this section it would have been necessary to replace 4 or 5 times.

Mine C—Has 5200 ft. of Carlon E Pipe in use of which 1600 ft. has given unflinching service for 10 months. Several weeks ago 6 men installed 2 pumps and 3000 ft. of Carlon E Pipe in one day. Labor cost \$84.30.

Estimated labor cost for ordinary black pipe, \$262.90. Quick installation of Carlon E Pipe also saved production from being cut in half by sudden water.

AVAILABILITY

Available in standard pipe sizes from stock and priced competitively in sizes ½", ¾", 1", 1¼", 1½", 2", 3", coiled, 4" and 6" in straight lengths.

SPECIAL TRIAL OFFER

Carlon E is furnished in 200 ft. coils for easy handling. To enable you to make a practical trial and thorough test of this new synthetic pipe in your mine we will furnish one coil (200 ft.) of the 2" size at the 2000 ft. quantity price of 40¢ per foot, or \$80.00 on the condition that if it does not prove entirely satisfactory within a period of one year it may be returned for full credit. *Order today.*

CARTER
PRODUCTS CORPORATION

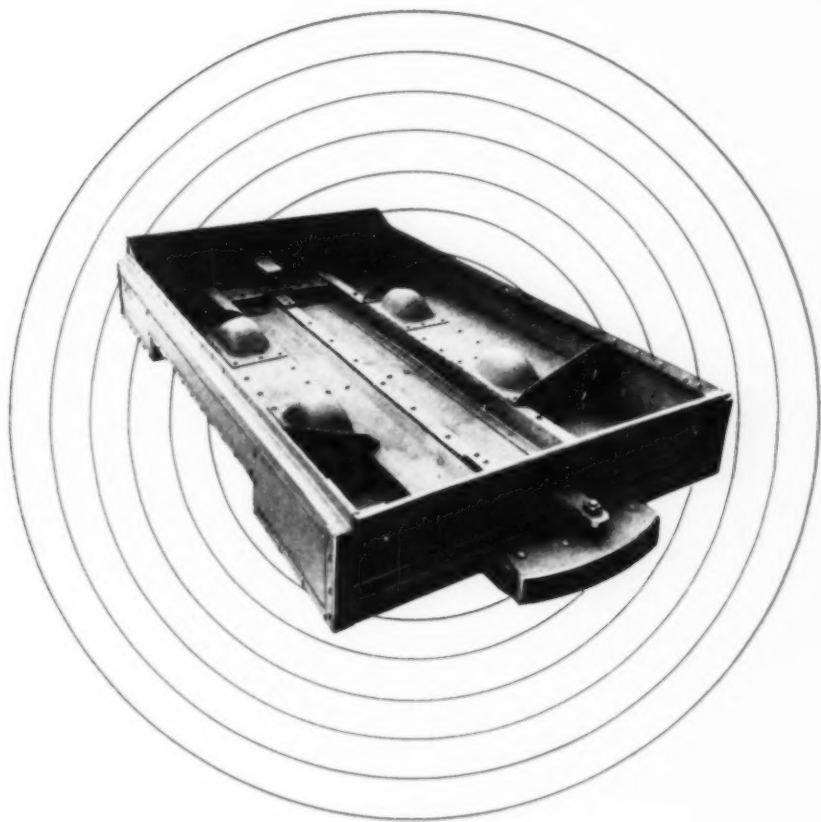


Manufacturers of Extruded Plastics

10225 Meech Avenue, Cleveland 5, Ohio
Phone: BRoadway 6565



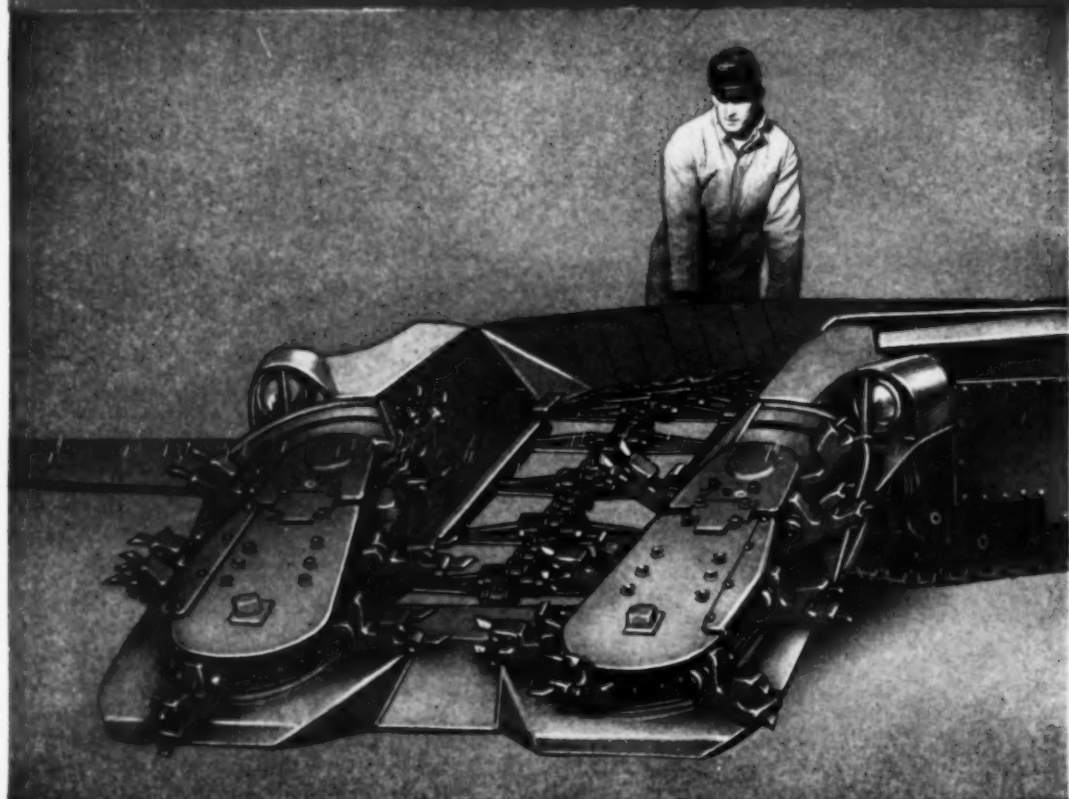
*CUSTOM-ENGINEERED
MINE CARS . . .*



ENTERPRISE

WHEEL AND CAR CORPORATION
BRISTOL, VIRGINIA - TENNESSEE
HUNTINGTON, WEST VIRGINIA

The **GOODMAN** *Type* **660**



LOW HEIGHT

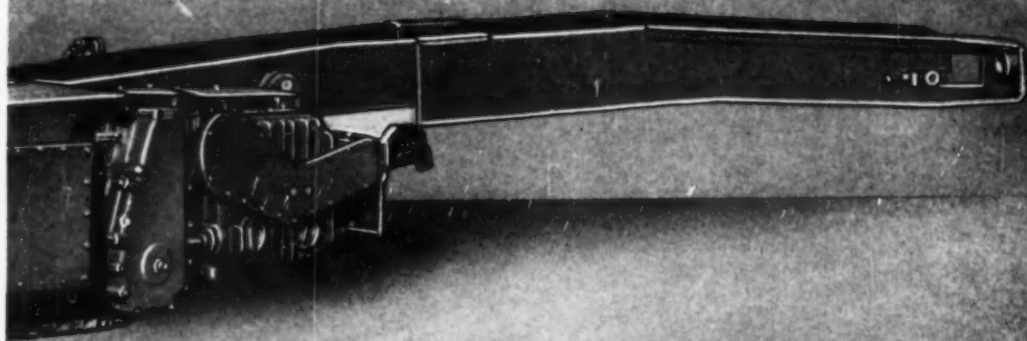
HIGH CAPACITY

SWINGING LOADING HEAD

SWINGING REAR CONVEYOR

HYDRAULIC CONTROL

TRACTOR TREAD LOADER



Let us send you descriptive bulletin **CLT-496**

HALSTED ST. AT 48TH **GOODMAN** CHICAGO 9, ILLINOIS
MANUFACTURING
COMPANY

in Great Britain: The Shillingham Engineering Company, Ltd.

S-D "Whopper" rotary



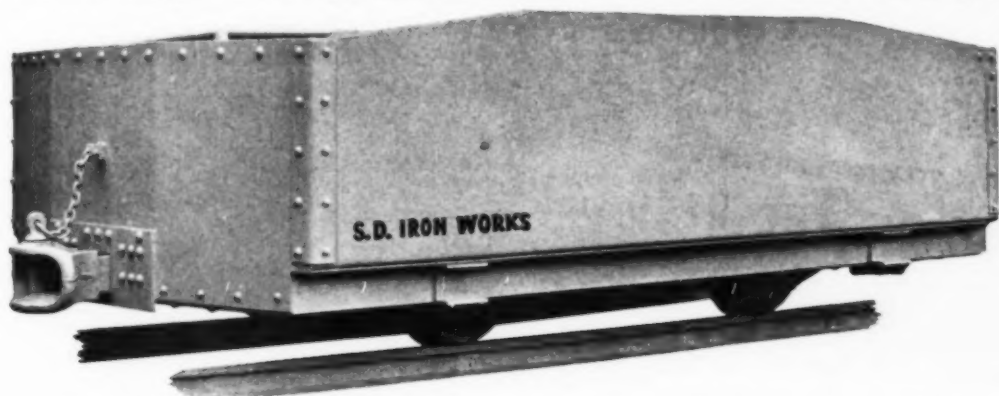
IN THE S-D "WHOPPER" ROTARY CAR, you get Cantilever construction . . . Maximum capacity . . . No binders to strip off against ribs. No unnecessary weight. Easily repaired. Supporting all the weight on the flares are the massive crosswise cantilever structural members at the ends of the car body, resting on and attached to the rectangular steel truck frame. Simple, strong. Pan Bottom. Drop Axles. Armor Plate Bumpers.

Have you thought about changing over to AUTOMATIC DROP BOTTOM CARS? If so, investigate the Industry's latest, most efficient "Automatic"—the S-D "Completely Sealed Automatic" with our fool-proof "Jerk-out" unlatching mechanism underneath the car.

Builders of the "COMPLETELY SEALED" automatic

cars Last Longer..

... because they are built to take Rotary Car punishment consistently.



Throughout the coal mining industry, for over 40 years, Sanford-Day has been recognized for its ability to build Rotary-Dump mine cars that stand up through the years to meet the hard service demanded of these cars. We developed the "low-floor" types of large capacity cars and our "Whopper" Rotary-Dump cars will give

you more capacity for any given overall dimensions.

If you need replacements in Rotary or End Dump cars, let one of our representatives give you complete details of how S-D "Whopper" cars are designed and built... why they last longer.



drop bottom car...

Sanford-Day Iron Works
KNOXVILLE TENNESSEE

Speaking of Dragline Buckets



Here's THE RECORD!

At a large bituminous strip coal mine using a Bucyrus-Erie 1150-B walking dragline, the Bucyrus-Erie 25-cubic-yard bucket shown here was alternated with the same size bucket of competitive manufacture. The buckets were kept on the excavator until major shop repairs were required. Here's the comparison:

	Bucyrus-Erie Red Arch 25 cu. yd. dragline bucket	Competitive 25 cu. yd. dragline bucket
Minimum Time on Machine	1018 hours	162 hours
Maximum Time on Machine	1644 hours	1291 hours
Average Time on Machine	1293 hours	581 hours

A Record — Not For 30, 60 or 90 Days But For 20½ MONTHS!

These are actual digging hours during the 20½-month period from Sept. 4, 1947, to May 19, 1949 — The durability of the Bucyrus-Erie 25-cubic-yard dragline bucket is almost 2¼ times that of the competing bucket.

and Over this period the 1150-B averaged 67.93 cycles per digging hour with the Bucyrus-Erie Red Arch bucket and only 63.64 cycles per digging hour with the competitive bucket. Furthermore, high single shift, high triple shift and high month output records were established with this Red Arch bucket.

21849

Choose

**BUCYRUS
ERIE**

**Red Arch
Dragline Buckets**

For

**Durability
High Output
Low Maintenance Costs**



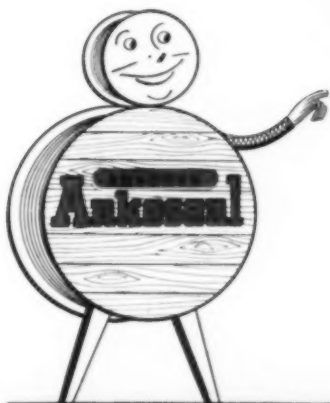
BUCYRUS-ERIE COMPANY, South Milwaukee, Wisconsin

**You buy protection
against these arch enemies
of mine cable**



**when
you
specify**

ANKOSEAL
Ankoseal

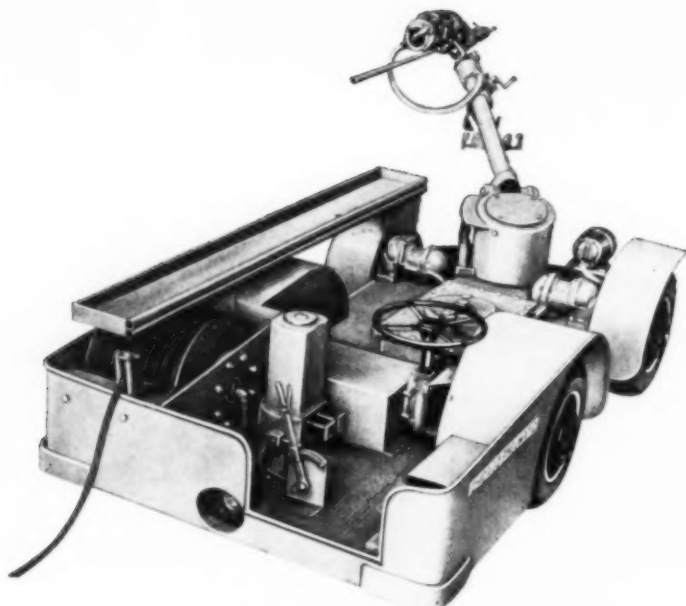


By providing a combination of physical toughness and chemical inertness, Ansonia Ankoseal Cable has exceptionally high resistance to the elements which are so destructive to the old style cables. Besides the obvious advantages of its longer service life, Ansonia Ankoseal brings impressive weight saving to the mining operation whether the cable be for power or telephone use. For example, a comparison you can make for yourself using 26 pair—No. 22 will show Ansonia Ankoseal saving 20% over rubber plus neoprene, and as much as 50% over paper and lead cable. If you haven't the full story of what Ansonia Ankoseal can do for you, please write us for more information.

THE ANSONIA ELECTRICAL COMPANY

SUBSIDIARY OF NOMA ELECTRIC CORPORATION

ANSONIA, CONNECTICUT



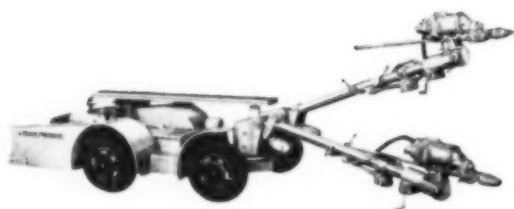
keeps ahead of any loader

Combining mobility with fast drilling, the CP One-Man Permissible Tramdrill is making remarkable records for speed and economy in shot-hole drilling.

Drills shot holes in coal up to 4½" in diameter, at any angle, and with four inches of roof or bottom. Also drills in rock, except sandstone.

For use in trackless mines — drilling, tramming and cable reel are all powered by electric motors. Electrically actuated CP Drill Arm has all controls at end of arm, within easy reach of operator. The CP Tramdrill complies with all requirements of the U. S. Bureau of Mines for permissibility.

For full specifications, write for copy of SP-3004.



CP Tramdrill is also furnished with two Drill Arms — Model TDD



PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

You Get Longer Service from **Rome 60** MINING CABLES!



Look for Appro. No. P-105 BM Molded in the Neoprene sheath—your assurance of compliance with Federal and Pennsylvania Safety Codes.

NEOPRENE WEBBING provides *extra* protection against shorts

Short cuts don't cut shorts . . . another reason why more mines are switching to Rome 60 Mining Cables. The Neoprene webbing which separates the ground wire from the two insulated conductors on Rome Parallel Duplex is only one example of the *extra protection* Rome builds into its products to minimize your operating costs.

Aided by alert research and engineering, Rome

is constantly on the lookout for better materials and better methods. That's why Rome 60 Mining Cables are regarded by mine operators as the best available. Crush resistant, heat resistant, flame resistant, acid resistant, abrasion resistant, non-kinking, and uniform in diameter, they combine *all* the qualities that give you the longest service. Ask for our descriptive folder and compare for yourself.

IT COSTS LESS TO BUY THE BEST...BUY ROME 60

THE ROME 60 LINE INCLUDES:

- Type SO portable cords
- Single conductor locomotive cables
- Concentric mining machine cables
- Twin (parallel duplex) mining machine cables—types W and G
- Multiple conductor portable power cables—types W and G





**a case of jitters
that empties railroad cars**

SHAKES HARDER AND LONGER ON SKF SPHERICAL ROLLER BEARINGS

The Robins Car "Shakeout", built by the Robins Conveyors division of Hewitt-Robins, Inc., is an ingenious device that transmits violent mechanical jitters to the hopper-bottom railroad car.

Each "Shakeout" is equipped with two SKF Spherical Roller Bearings which support an unbalanced shaft whose rotation sets up 1,000 rhythmic impulses a minute.

This rugged operation for hours on end, constitutes one of the most punishing jobs

ever imposed on SKF Bearings. When one unit was dismantled, after unloading 1,020,000 tons of material from 20,400 cars, the moving parts showed no trace of wear. A tribute to the ruggedness of SKF Bearings.

From the beginning to the end of the coal operation, SKF Bearings play a major role. Our engineers are prepared to help you with your bearing applications. Write: SKF Industries, Inc., Philadelphia 32, Pa.

6621



Industrial Bearings engineered by

SKF

ANOTHER FIRST by **STERLING!**

NEW



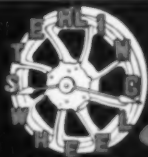
Round-Spoke Balanced Design
Cast Steel Wheel is 60% Stronger
... Assures Greater Mileage,
Lower Operating Cost

First in **design** — and first in **service** — Sterling cast steel **precision** Balanced Design wheels now offer these **PLUS** features that mean more profitable operation for mine cars — at no additional cost.

- + Exclusive Balanced Design . . . reduces wear and tear on track, cars and wheels, assures smoother transportation.
- + Withstands crushing force of over 150 tons.
- + 60% stronger . . . 6% more weight.
- + Solid castings . . . that mean higher quality, longer life.

GET THE FACTS — from your Sterling representative. Learn how Sterling cast steel new round-spoke Balanced Design wheels can lower **YOUR** operating costs. (We solicit your inquiry on miscellaneous steel castings — produced to your specifications.)

REPRESENTATIVES: R. E. GERDETZ EQUIPMENT CO., Law & Commerce Bldg., Box 423, Bluefield; H. P. HILLHOUSE, JR., 20 N. 21st St., Birmingham, Alabama; J. E. NIESER, 720 Roselawn Ave., Pittsburgh, Pennsylvania; SERVICE SUPPLY CO., Hawley Bldg., Wheeling, W. Va.; WETZEL EQUIPMENT AGENCY, 375 Southwest Temple St., Salt Lake City, Utah



IT'S TIME TO RE WHEEL
WITH STERLING CAST STEEL

Sterling

STEEL CASTING CO.
EAST ST. LOUIS, ILLINOIS

A detailed illustration of a crane with a lattice boom lifting a large, thick coil of rope. The rope is coiled in a way that forms the letter 'D'. The crane is positioned on the left side of the frame, and the rope extends from the crane's hook, loops around to form the 'D', and then continues down towards the bottom right. The background is plain white.

BOOM

**ON PRODUCTION
COSTS WITH . . .**

PRIMACORD

YOU'RE taking a big bite out of digging costs when you blast with Primacord. Because Primacord hook-ups help produce the kind of well-broken rock that makes digging easier. And better digging speeds operations all along the line.

Primacord makes this possible through a combination of forces that work as a hard-hitting team. You plan trunk lines so that front row holes shoot a split-second before succeeding rows. You load down hole lines so that the Primacord contacts every cartridge. When you fire, every cartridge in the load explodes at full power.

A non-conductor of electricity, Primacord is insensitive to stray currents . . . hooks up with simple square knots and half hitches . . . is wound on light weight spools in three grades to meet every blasting condition. Ask your supplier which grade you should use; or write direct to The Ensign-Bickford Company, Simsbury, Connecticut.

P-25

**PRIMACORD-
BICKFORD**

**Detonating
• Fuse •**

Also Ensign-Bickford Safety Fuse Since 1836

NOVEMBER, 1949

IVAN A. GIVEN, EDITOR

At the Turn?

MORE TIME will be needed to determine if the coal industry has reached the turn in the road to higher costs, increasing service interruptions and growing consumer dissatisfaction. But, perhaps, if it is not at it, it is close to it. In 1949, for the first time in a decade, Mr. Lewis has found himself at some disadvantage in exacting more in cost from coal producers and coal consumers, and more in sacrifices by his membership to support his demands. A Senate subcommittee has delved into his exercise of monopoly powers, the public has been less inclined to accept his contentions at face value, the number of miners who want to work and are willing to defy him and his agents to do so has increased substantially, and he has even been sued by some members over his policies.

All in all, Mr. Lewis is having his troubles, though they are small compared to those of the operators, his members and the fuel-using public, and it might well be that the turn has been reached, since there is growing evidence that further forays against the public pocketbook and convenience will be greeted with less and less sympathy within and without the union. This is in line with the trend of the times which, in spite of the picture at the moment, is more and more one of insistence on a cessation of arbitrary action and a return to reasonableness in relations with employers. This is not to imply that all will be smooth sailing in the future, however. The Congressional grant of monopoly power is yet to be rescinded, and this, in combination with Mr. Lewis' known outlook on things, could still be the cause of considerable difficulty. But, to repeat, conditions seem to be changing and, consequently, there is good reason for looking hopefully to the future.

If the turn has been reached, it is high time. More than anything else, coal needs an opportunity to settle down and really work on lower

cost, higher quality and better service to the consumer. If that opportunity is here at last in full measure, coal can do something significant to take advantage of such developments as the application made some weeks ago by the Ohio Fuel Gas Co. to the Federal Power Commission for "one of the largest rate increases ever proposed." Without relief from work stoppages, production restrictions and forced increases in cost, developments such as this can only throw into higher relief the competitive difficulties arising out of the arbitrary actions of union officialdom. But if coal could devote all its efforts to cost reduction, quality improvement and sales, and could assure consumers of an uninterrupted fuel supply, the stage would be set for real progress.

By any standard, coal's advances in the past decade or two stand up well. But to the man who likes to see things move, the future offers real achievements in further cost reduction, quality improvement and sales and service betterment, all leading to more and more-profitable business, provided the right operating climate can be attained. Few operations today—good as many of them are—are making the most of the equipment and methods on hand or available. In addition, new machines and new methods offer even-greater possibilities when backed up by skilled man power, good crews interested in their jobs, research to hold and build markets, and creative selling.

Even if it should turn out that coal has to wait a little longer for a change in climate, increased pressure now will advance the date and insure a head start in the race for the growing markets of tomorrow. The change will come, and by putting a basic and essential industry in a better position to render a real service to the nation's fuel and energy uses, coal men—miners, managers and investors can assure themselves a stimulating and profitable future.

How Some Key Coal Men Moved Up and How They View Chances Now for...



C. H. SNYDER—"Know your own job thoroughly and seek knowledge of other jobs."



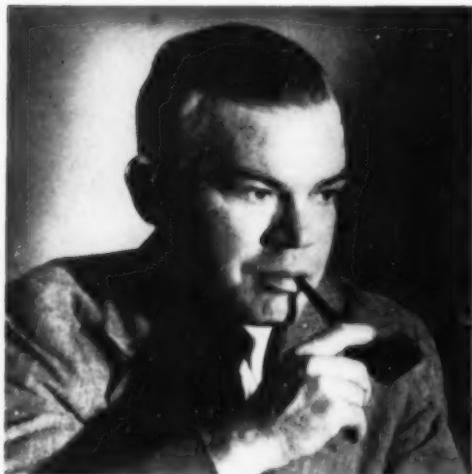
J. D. REILLY—"I always looked for something new to keep out of a rut."

Getting Ahead in Coal Mining

Opportunities in Coal Are Better Now Than Ever—High Tonnage, Low Cost, Hard Work and Self-Improvement the Big Factors in Getting Ahead—How Seven Industry Leaders Started Out the Hard Way and Worked Up

FOR THE MAN WHO IS WILLING to work hard and really wants to get ahead, the opportunities in coal mining are good. That's the way it always has been in coal, and it's truer now than ever before.

Many of the men now holding down top desks and key jobs in coal



EVAN EVANS—"Whenever I took on a job, I did it the best I could."



C. E. JENKINS—"I seldom dodged a responsibility. In fact, I often went beyond issued orders."



G. F. BIELER—"Now there are 10 big jobs for every one there used to be."



L. RUSSELL KELCE—"Coal holds great futures for those who love their business."

started out from scratch. Some of them may have had a little piece of coal land to start with. Others may have had just a pick and shovel or a small truck. Most of them, though, began with no more than a will to work hard and learn fast.

These men never asked for lucky breaks. It was luck enough that they could live and work in the United States. That means they had all the opportunities that democratic government, free enterprise

and a growing nation provide. Almost anywhere else, they would have been stuck where they started. But being Americans, they weren't pigeonholed in a "laboring class" and they didn't have to gamble on luck or "pull." They worked long and hard, looked for ways to learn more and make better men of themselves and kept a sharp eye open for opportunities ahead. Now they are up front.

How did they get there? What did they start with and what did they add? What made them want to take on bigger jobs? Can young men just now starting out in coal mining get ahead the same way?

For the answers, look at seven coal men who started at the bottom of the ladder and climbed up to responsible jobs. These aren't the only ones who have worked their way up in coal mining. There are lots of others besides. But the following stories

show how a young man who is willing to work to get ahead can build a successful career in coal mining.

How Seven Men Got Ahead

EVAN EVANS IS ONE of the men who started at the bottom and rose to the top. Both of his grandfathers worked in coal mines, either in this country or in Wales, and his father was a Pennsylvania state mine inspector. That's why Mr. Evans had coal mining in his blood.

In 1909, as a boy just out of high school, he got a job carrying water in a colliery at Coaldale, Pa. Thirty-eight years later, in 1947, he moved up to the president's desk, Lehigh Navigation Coal Co., Lansford, Pa.

The 38 years between was filled with hard work, steady self-improvement, growing experience and step-by-step advance. After a period as waterboy, young Evan became a laborer. He worked for a while in the breaker and then got a job as machinist's helper. Meanwhile, he nursed an ambition to be a contractor. With this in mind, he signed up for a correspondence course in engineering and finished it in two years, working meanwhile as a chainman with the company's engineers. By 1918, after a period as borough engineer for the town of Coaldale, he had become district engineer for the company. He served for a while with the Army



J. E. BOWMAN—"In coal mining, there's a new challenge every day."

How Hard Work and Self-Reliance Opened Up the Way to Promotion

Corps of Engineers in World War I and then, in 1919, returned to his old job as district engineer.

In 1921, still thinking of becoming a contractor, Mr. Evans asked for a six-months leave of absence to try going into business for himself. What he wanted was a sub-contract for some building the company was doing then. In the end, however, he decided to stick with the company. Next year, 1922, he was made assistant to the superintendent of Alliance Colliery, the company's smallest operation. When, in 1923, the Alliance superintendent moved up to a bigger job at the Coaldale Colliery, he took Mr. Evans along with them. By 1925 Mr. Evans had become superintendent of the Rahn Colliery. There he worked until 1928, when he returned to the Coaldale Colliery as superintendent. In 1935 he became operating assistant to the company's general superintendent. After a term as acting general superintendent in 1939, he was made general superintendent in 1940. In the same year he was elected vice president and general manager and in 1947 was made president.

In addition to his duties with Lehigh Navigation Coal Co., Mr. Evans served a term as chairman, Coal Division, American Institute of Mining & Metallurgical Engineers, and now is president, Lehigh Materials Co., Panther Valley Water Co., Summit Hill Water Co., and Anthracite Enterprises, Inc.; chairman, board of directors, First National Bank of Coaldale; a director, Homestead Building & Loan Association; and past president, St. David's Society of Schuylkill and Carbon Counties.

Like Mr. Evans, James D. Reilly, now vice president for operations, Hanna Coal Co., St. Clairsville, Ohio, is the son of a coal miner. Jim's father taught him to be on the job early and work hard all day. From 1923, when he first started work, until he took his first supervisory job in 1936, Jim was a rank-and-file miner and a strong union man. Moving at intervals from one company to another in Indiana, he gained wide experience in a variety of jobs, driving an entry in the solid, driving a mule, loading behind a machine and operating loading, cutting and breast machines. Later, in 1930 and 1931, he became a triprider and a motorman. From 1933 to 1936 he was, by turns, drill, shotfirer and cutting-machine operator.

Finding out that the union was a blind alley as far as advancement

was concerned, Mr. Reilly took a job with Snow Hill Coal Corp., Terre Haute, Ind., as section foreman in 1936—his first supervisory job. That same year he was put in charge of machine men, drillers and shotfirers. In 1938, after working for a while as mine foreman at Snow Hill's Fayette mine, he took over as general foreman of the Saxon mine, Walter Bledsoe & Co., Terre Haute. A year later he was made assistant superintendent.

In 1942, Mr. Reilly left Indiana and came to Ohio as underground superintendent, Piney Fork mine, Hanna Coal Co. In the same year he was made superintendent of the washery as well. Three years later he became general superintendent, Piney Fork and Dun Glen mines, and in 1946 was named general manager for all of Hanna's underground mines. Since 1947 he has been Hanna's vice president for operations, with responsibility for deep and strip mining, offices, stores and farms. He holds the same position with Hanna's Ohio affiliates, The Jefferson Coal Co. and Cadiz Mining Co.

The story of J. E. Bowman, president, Utilities Elkhorn Coal Co., Pikeville, Ky., follows a little different pattern from the careers of other men described in these pages. In the first place, Mr. Bowman says, he's the only native of Florida he knows who has made a career of coal mining. Secondly, Mr. Bowman approached the top desk in his company through non-operating departments.

Mr. Bowman's formal education came to an end in the eighth grade. After holding down a series of jobs in Florida and Georgia as a youngster, he decided to find a job in some remote place where he could save enough money to marry. He found his spot in the Harlan field, in eastern Kentucky, as secretary to the president of a coal-mining company. That was in 1922. One of his coal-mining friends warned him then that if he stayed with the industry six months, he'd love it too much to leave it.

That's the way it worked out. He stayed in Harlan County until 1926, meanwhile becoming cashier of another company, and then returned to Florida. But the pull of the coal

business was too strong and he returned to Kentucky in 1927 as office clerk and later office manager for a company that closed down in 1928. With that, he took his first position with Utilities Elkhorn as cashier in the construction department. From then on, he climbed straight up. He became auditor in 1929, assistant treasurer in 1932, treasurer in 1935, manager in 1939, general manager in 1940, vice president, general manager and director in 1941 and president in 1947. Incidentally, he married the girl, too—but that's another success story.

Mr. Bowman was not an operating man by experience or training but became one by necessity when the responsibility was thrust on him. The year 1938 was a lean period for a good many coal companies, including Utilities Elkhorn. With a shrinking market and old-fashioned mining equipment, production was down and the company was in bad financial condition. Since there wasn't anybody else around to be made manager, Mr. Bowman, then treasurer, was asked to take over. That's how he learned the operating end—he had to. How well he learned is shown in the company's tonnage records—189,000 tons in 1939; 1,045,000 tons in 1944.

Now, besides being president of Utilities Elkhorn, Mr. Bowman is president, High Point Elkhorn Coal Co. and Puncheon Creek Coal Co.; a director, Big Sandy-Elkhorn Coal Operators Association, and a director, Pikeville National Bank & Trust Co.

Cecil Jenkins, another coal man with an interesting story, changed not long ago from his position as division engineer, Jamison Coal & Coke Co., Farmington, W. Va., to another position to perform duties in his company's expansion program. After 27 years of heavy engineering and operating responsibilities, Mr. Jenkins felt that he should share with younger engineers some of the responsibilities required by the stepped-up methods of modern mining.

Mr. Jenkins started working summers in the mine when he was 9 years old. Fall, winter and spring he went to school until he had completed a year and a half of high school. In those days, a boy working alongside his father, as Cecil did, added "half a turn" to his father's pay, which was as low as 16c a ton. His father and buddy undermined the coal face by the coal-pick method in the early morning hours while Cecil and the buddy's young son shoveled the pick

REPRINTS OF THIS ARTICLE are available to companies wishing copies for distribution, at 20c each up to 100 copies. Larger-lot prices on request. Address: Editorial Dept., COAL AGE, 330 W. 42nd St., N. Y. 18.

cuttings into the "night empty." For a while, in 1900, when he was 11 years old, Cecil was a driver in the mine. Also, off and on, he worked as a trapper boy, earning 6c an hour. Years later, as district engineer, he helped reopen the old mine where he had worked as a boy.

In 1910, Mr. Jenkins took a job as back chainman in the engineering department, The Consolidation Coal Co., Fairmont, W. Va. By stages, he advanced to front chainman, transitman and on up the line until, in 1916, he was made district engineer, supervising the engineering of 9 mines and 10 engineers. He held that job through World War I. After the war, in 1920, he switched over to Clark Coal & Coke Co. as chief engineer and general superintendent, sharing responsibility for six mines.

By the time the depression came along in the early '30s, Mr. Jenkins had become division engineer and safety director for the West Virginia Division, Jamison Coal & Coke Co. Those were tough years. With production and engineering staffs cut down to bare bones, he had to do most of the work with part-time help. However, he helped keep tonnage up and costs down, made his mine the first 100% safety-cap operation in West Virginia and improved the safety record until compensation costs dropped to a minimum. Since then, he has helped guide his division of Jamison Coal & Coke Co. through another world war while younger men served in the armed forces. Also, he has helped keep tonnage high through the postwar boom.

Mr. Jenkins is a registered professional engineer in West Virginia and Pennsylvania and a past president of the Central West Virginia Coal Mining Institute.

G. Fred Bieler, now general superintendent, Snow Hill Coal Corp., Terre Haute, Ind., has come a long way since, in 1913, he started out as a trapper during summer vacations from school. His first full-time job, after he finished high school, was driving a mule in the mine. Even now, he thinks a foot injury he got in those early days was a lucky break. It made him a believer in safety.

In 1917, convinced that motors had a future in coal mining, Fred asked for and got a job as trippider. Soon after, being encouraged by his superintendent to take a correspondence course in electricity, he moved up to motorman and, after getting some experience as a face man and shotfirer, became an elec-

trician. He got his license as a fireboss in 1922, after studying a correspondence-school textbook on coal mining, and a year later was certified as a mine boss, meantime working for a while as haulage foreman.

That's how Mr. Bieler got the training and experience that equipped him to cash in on an opportunity that came along in 1923, when he was asked to be mine foreman for Utilities Coal Co. Taking the new job meant that he had to leave the mine where his father was mine foreman and later superintendent. But that's the way Mr. Bieler wanted it. He wanted to be on his own. The new job lasted four years, until the mine worked out.

Over the next few years Mr. Bieler had several jobs, each of which added something to his experience. He worked for a while on brattice and seals, as an electrician, room boss and mine boss and, in 1933 and 1934, helped sink two shafts for a new mine.

In 1934, seeing a future in loading machines, Mr. Bieler sought and got a job as section boss with Snow Hill Corp., which then was installing its first loaders. Meanwhile, he had finished another correspondence course in coal mining. In 1936 he was made mine manager; in 1940, mine superintendent, and in 1947, general superintendent of all Snow Hill mines. That's where he is now, still a fairly young man.

As pointed out earlier, these are only a few of the many success stories that show how men who really want to get ahead in coal mining can do so. Lots of others have done the same thing. For example, there's L. Russell Kelce, who just this year was made president, Sinclair Coal Co., Kansas City, Mo. Mr. Kelce had to quit high school when his father was hurt in a mine accident. By working hard to improve his skill and keeping his eyes wide open for opportunities, he moved up through better and better jobs until, at the age of 19, he be-

came a mine superintendent. Returning from World War I in 1918, he went to Oklahoma and started a small strip mine, arranging to sell his coal through Sinclair Coal Co. This became the first of many joint enterprises with Sinclair which, with its affiliated companies and 5,006,740 tons of production, was the 14th largest coal producer in the nation in 1948.

Another is C. H. Snyder, president, Sunnyhill Coal Co., Pittsburgh, Pa. Mr. Snyder finished high school in 1927 and, together with D. H. Swanson, now Sunnyhill's vice president in charge of sales, set up an informal partnership for hauling coal, rock and gravel in the one truck they owned. In 1931 they incorporated and started hauling coal in much larger volume to industrial consumers. They saved their profits for reinvestment in the business and, in 1938, began stripping in Washington County, Pa. In 1945 they opened a strip and deep mine in northern West Virginia and in 1946 a large strip mine in Ohio.

Meanwhile, Mr. Snyder had watched the chipping heads of his overburden drills with special interest. Why not use a bigger rotating chipping head underground, he wondered, to break coal down continuously off the face? The more he thought about it, the better the idea seemed. The upshot was that by 1948 he had designed and built a new type of machine for underground mining. He called it the Colmol and opened a deep mine in West Virginia to try it out. Since then, the Colmol has stirred worldwide interest. Now Mr. Snyder is president, Sunnyhill Coal Co., with a production that rose from 166,500 tons in 1942 to 1,089,250 tons in 1948. He is treasurer of Snyder & Swanson, Inc., sales agent for Sunnyhill and other coals with annual sales of over 2,500,000 tons, and his Colmol is being manufactured by The Colmol Co., an affiliate of Jeffrey Mfg. Co., with Mr. Snyder as president.

What They Did to Move Up

WHY DID THESE MEN—Mr. Snyder, Mr. Reilly and the others—want to get ahead. How did they go about it?

For one thing, they were not content to let chance or whim decide whether they would go up or stay put. They were convinced that they could get better jobs if they worked to get them and they were willing

to accept the responsibility—and the opportunities that came with it. They liked the satisfaction that comes from doing a bigger job—and bigger ones were ahead. They liked to see a job done right and believed they could do it better—and were willing to put that belief to the test. They had ambition of the right kind—the kind that keeps

How Seven Top Coal Men Got Ready for the Opportunities Ahead

an eye on the job next ahead, not on the man next ahead.

Also, they wanted independence and security—an opportunity to make decisions on their own and to gain financial stability for themselves and their families. For example, Mr. Reilly found early in his career that union affiliation was fixing the pattern of his life. He sought a chance to get ahead by moving over to the company side. Mr. Jenkins, as well as others, wanted to move up into the upper brackets to give his family a better break. Mr. Evans, thought he had no ambition to become a "company man" and, in fact, had a cordial dislike for "company men" when he was a youngster, saw his company as the best avenue to independence. Mr. Bieler remembers that the regular monthly paychecks of his foremen looked pretty good to him as long as he was a rank-and-file miner.

Finally, every one of these men had coal in his blood—every one except Mr. Bowman, and he got it in his blood within six months after he started work in Harlan County. Mr. Evans' father and both grandfathers worked in coal mines and young Evan grew up in the heart of the anthracite region. Mr. Reilly's father, a miner, taught Jim his first lessons in coal mining. Mr. Bieler's father was a mine foreman and superintendent. Mr. Jenkins' father took him into the mine and taught him how to work hard and keep safe. Mr. Kelce's father, grandfather and great-grandfather were in the coal-mining business all their lives—a history starting back in 1836 in Pennsylvania—and his two brothers, Merl C. and T. L. Kelce, are Sinclair Coal Co. vice presidents.

With coal in their blood, these men always have been proud of their industry. Having lived most of their years in coal country, they know the coal miner deserves a break. Whenever bigger jobs, larger responsibilities and more authority have come their way, they have used them as opportunities to make work easier, safer and more rewarding for the miner.

Getting ahead, as it shows up in the experience of these men, boils down mostly to two things: (1) doing things that gain recognition and (2) being ready when opportunity comes along. All of them believed from the beginning that promotion depends on achievement, not on pull or influence. "Some of the best miners and section bosses I've known are still miners and section

bosses because they thought they had to have 'pull' to get ahead," Mr. Reilly points out.

Mr. Reilly says that he made up his mind at the start to earn recognition. To do this, he laid out a three-way strategy: he organized a championship first-aid team, learned how to make a speech and loaded more coal from his section than any other foreman. It wasn't long before company officials and outsiders were asking for his counsel about safety and production.

Mr. Bowman gained recognition by successfully steering his company through stormy financial weather in the late '30s. Stockholders and directors were ready to abandon the company, but Mr. Bowman, left almost alone to salvage the investment and restore production, raised the money he needed from among the men who knew and trusted him. When he found out that sales were low because preparation was poor, he found ways to turn out cleaner coal. In the end, he put Utilities Elkhorn back on its feet tonnage-wise and money-wise and tagged himself as a man of real ability.

Mr. Evans gained recognition by being up front in nearly every advance Lehigh Navigation Coal Co. has made since he started work. A friend who has worked with him for 40 years remembers that the accuracy of his figures, his ability to catch on and his wide-awake imagination marked him as a promising young engineer from the beginning. His company was the first to set up a full-fledged personnel department in the anthracite field, in 1924. The company had its own pension plan for deserving rank-and-file miners—another first in anthracite—plus a workmen's compensation plan well in advance of compensation required by law. Under his leadership as general super-

intendent, vice president and more recently as president, the company has developed new tonnage, reopened old mines, reclaimed culm banks, expanded stripping, improved transportation and boosted the efficiency of breaker and surface operations. His company has pioneered in recovery and sale of fine sizes, built the first froth-flotation plant in the anthracite field and led in stream purification and the building of mining-town recreation centers. Just recently, Lehigh Navigation has developed and marketed a new product called "Lelite," a light-weight high-strength concrete aggregate made from shale.

Like the others, Mr. Jenkins earned recognition by boosting tonnage and keeping cost down. For instance, early in his career, shortly after moving into a new job, he found that transportation was a bottleneck at one mine. On his own initiative, he built sidetracks to speed loading. Within a few months, when bigger tonnage and lower costs began to show up in the front-office records, he was called in to explain them. Instead of being censured for spending money to build the sidetracks at a time when the company was operating in the red, he was congratulated for mining coal at lower cost.

As for Mr. Bieler, his record at Snow Hill bears out what he says about getting recognition: "The best and only real way to be spotted by the top men is to get the coal out. Strikes and breakdowns may come along, but what really counts at the end of the year is the coal you mined and what it cost to produce it."

Getting out the coal, keeping costs down, taking a strong hand in forward moves and doing things that other men have despaired of doing—those are the ways to get recognition.

How They Taught Themselves

BUT GETTING READY to take on a bigger job is just as important as getting recognition. The man who moves up before he's ready for the next job ahead is taking a dangerous gamble.

One way to get ready is to take correspondence courses. Along with other promising young men, that's what Mr. Bieler and Mr. Evans did. They burned a lot of midnight oil, but when the chance came to move ahead, they were ready with wider knowledge and better skill.

Formal courses aren't the only

kind of education open to young men who want to move up the ladder. Mr. Jenkins, for example, studied books and manuals he acquired from various sources. When problems came up that he couldn't answer, he looked up the answers in the textbooks. He didn't take formal examinations. The only examinations he did take were the day-by-day tests on his job.

All these men added to their knowledge by doing a wide variety of jobs around the mine. In other words, they learned by experience

and by applying sound horse sense to their everyday problems. As stated earlier, Mr. Reilly was by turns a cutting- and loading-machine operator, shotfirer, motorman and driller. Mr. Evans was a laborer, machinist, engineer, labor-relations director and preparation man. Mr. Bieler was a mule driver, triprider, motorman, shotfirer, electrician, face worker, brattice man and haulage foreman. Mr. Jenkins was a mule driver, trapper, laborer, engineer, safety director and production official. Mr. Bowman was secretary, clerk, accountant, treasurer and, by necessity, a production chief.

Whenever these men took on a new job, they studied it to find out what made it go. They mastered its fundamentals, improved on them and, when they moved on to another job, left the old job in better shape for the next man. When trouble showed up, they searched out the basic obstacle and then did something about it—right away. This all adds up to wide experience in most of the jobs around the mine, a real understanding of the problems and attitudes of workers and supervisors and a bird's-eye view of the over-all coal-mining operation. That's the kind of knowledge that makes a man ready to move ahead.

What was the attitude of these men toward their work? They aren't the kind to brag about their accomplishments. In fact, every one of them shies away from talking about himself. However, they described their approach to their work as follows:

"Whenever I took on a job, I did it the best I could," Mr. Evans says.

"If a man loves his work, every day is a vacation," Mr. Bowman argues. Mr. Bowman, by the way, took the first vacation in his life just this past summer. "In coal mining, there's a new challenge every day," he adds.

"Whenever I had a job to do, I did it with a determination to master it," Mr. Jenkins says. "I always made up my mind what I wanted and then went after it. I seldom dodged a responsibility. In fact, I often went beyond issued orders when I saw an opportunity to further the company's interests," he states.

"I always looked for something new to do to keep out of a rut, but I always refused to move up to the next job until I had mastered the job I had," Mr. Reilly reports.

"I realized, as all the other Kelces have done, that the way to get

ahead was to start at the bottom and work hard enough to secure a higher job step by step on merit only," Mr. Kelce says.

"Learn every phase of the coal business," Mr. Snyder urges. "Know your own job thoroughly and seek knowledge about other jobs. Make up your mind to overcome all your obstacles and solve all your problems and, when you've given your all, call up that last ounce of reserve that everyone has. Fate always tests a man's mettle by putting him to the ultimate test before he can step up the ladder."

"Mr. Evans never made a big issue out of a small question. He brushed aside the things that weren't important." That's how an old friend of Mr. Evans describes his approach to his job.

In addition, most men on their way up soon learned that it's easy to get bogged down in details. That's why they learned to delegate

responsibility. As Mr. Bowman says, "A supervisor's job is to build men, not to boss them. A man can't do his work if he's watched over and questioned and nagged at. Give him a job to do and then leave him free to it."

Mr. Reilly feels much the same way: "Pick your men carefully—men you can trust—and put them on their own."

Sometimes, though, even if a man is skillful and ambitious, everything seems to go wrong or stand still. What can he do then?

"I've never worked up a case of stomach ulcers worrying about impossible situations," Mr. Reilly says. "You've got to realize that there are times, sometimes as long as six months, when your job seems to stand still and everything seems to work against you. You've just got to accept those situations, stand up to them and hold your ground the best you can."

How They View the Chances Now

CAN A YOUNG MAN today, starting out with ambition, courage and a willingness to work hard, move ahead into key jobs closer to the top?

For the answer to this question, take one more look at the men whose careers and beliefs are described above. Having come a long way, they now are in a position to speak from experience. Also, at or near the top of the heap, they can scan broad horizons and see the picture as a whole. Here is what they say:

"There used to be only three major jobs in a mine—room boss, fire boss and mine boss," Mr. Bieler remembers. "But now the field is much bigger and there are more opportunities than ever before. There are 10 big jobs around the mine now for every one there used to be."

Mr. Jenkins points out, "The average age of engineers in northern West Virginia is 40 or over. That means good opportunities for a young man who is willing to work hard to get ahead."

"New machines in the mines call for new skills and smart men. That's why opportunities in coal mining now are 10 times what they were in the '30s," Mr. Reilly says.

"My family, from my great-grandfather back in 1836 to my brothers and myself, always have felt that coal mining is a basic industry and holds great futures for those who love their business and

work hard," Mr. Kelce points out.

Added all together, then, the chances of getting ahead in coal mining are good. The truth is, about half of the biggest jobs in coal—mine foremen, superintendents, division and chief engineers, vice presidents for operations and presidents—have to be refilled every 10 years because of retirements, switches to other jobs and deaths. That means that each year somebody new takes over one leading job out of every 20.

As the careers of these men show, such getting ahead depends on the following:

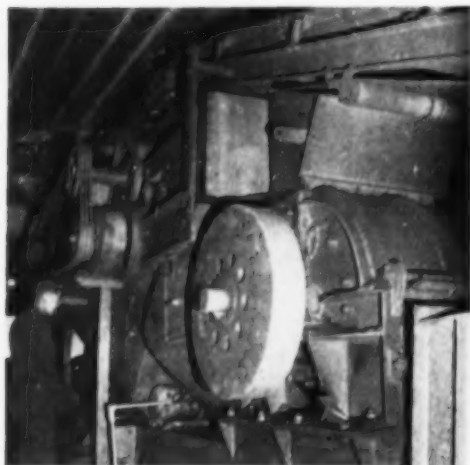
1. Hard work.
2. Ambition.
3. Initiative.
4. Self-improvement.
5. High tonnage and low cost.

If a man masters these keys to promotion, he can unlock the opportunities ahead. Not everybody can become the president, to be sure. But lots of jobs short of the president's desk and the vice president's office are big jobs also. The young men who aspire to them, besides strengthening their own standing, will do their industry and their company a favor. Every step up means bigger responsibility, better pay, more security and a share in advancing the coal industry and helping the people who depend on it for their living. The opportunities are there for the men who seek them out.

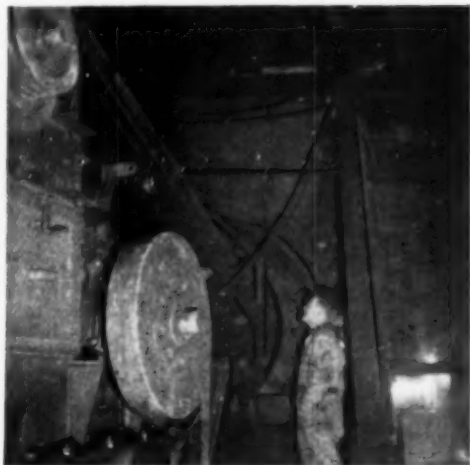
How Coal Is Crushed and Sized in Compact Addition to Old Tipple



MINUS 3-IN COAL from old tippie enters on belt at right and passes over shaker screens in portable unit.



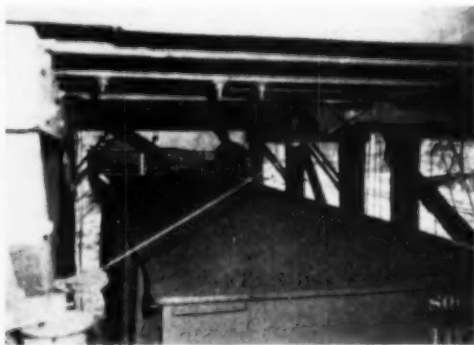
TWO HOPPERS store stoker coal and screenings. Plus 1-in sizes are crushed to 1x0-in in hammermill at right center.



ROTARY HOIST beyond hammermill feeds crushed coal onto overhead belt, which discharges onto built-in shaker screens.



STOKER COAL rides on portable belt from hopper to vertical steel chute, whence it falls into railroad car below.



SCREENINGS are loaded into car by means of boom connected to hopper in portable tippie.



NEW PORTABLE TIPPLE, integrated with old tippel, takes little plant space but does efficient crushing and sizing.



POWER DUCKBILL makes two passes in room. Cutting machine trams right when duckbill is drawn back to start left-hand pass.



BELT LOADS coal into mine cars in main entry. Light steel trough placed between cars prevents spillage as cars move forward.

Building up Glen Mary

Compact, Self-Contained Crushing and Sizing Unit Added to Old Tippel Prepares Stoker Coal and Screenings — Underground Operations Featured by Power Duckbills in Seam Averaging 34 In—Face Cycle Efficient

LOADING at the face with power duckbills and producing 1x $\frac{1}{4}$ -in stoker coal and $\frac{1}{4}$ x0-in screenings in a new portable tippel, the Glen

Mary Coal Co., Robbins, Tenn., a subsidiary of Walter Bledsoe & Co., Terre Haute, Ind., is shipping 900 tons per day from a mine that origi-

nally was a wartime Defense Plant Corp. facility providing fuel for the atomic-bomb developments at nearby Oak Ridge, Tenn. In November, 1946, having served its wartime purpose, the mine was closed down. It remained inactive until May, 1947, when it was purchased from the War Assets Administration and operations were started up by the Glen Mary Coal Co.

The Glen Mary seam, which the mine works, ranges in thickness

Smart Management and Supervision Keep Coal Moving at Glen Mary



TOP MEN AT GLEN MARY—C. J. King (left), chief electrician; C. M. Bengt, superintendent; A. Tippett, acting tipple superintendent from Morley, Tenn.; and M. C. Haley, preparation engineer, southern division, Walter Bledsoe & Co.



C. V. OWEN, office manager and book-keeper, keeps supplies on hand, bills loaded cars, figures payrolls and keeps records.

from 30 in up to 7 ft and averages about 34 in. The coal is highly friable. A band of cannel coal, sometimes as thick as 7 in, comes and goes, but there are no major slate or rock partings. The roof is mostly blue slate, with some sandstone, and generally holds up well. Posts in rooms and butt entries usually are set on 4-ft centers and crossbars are used where needed in rooms and along main entries. The mine is non-gassy.

Take Bottom for Haulage Road

Advancing room-and-pillar is the method used in mining. Formerly, under wartime operation, top was brushed along the main haulageway to provide 5-ft clearance, but the present operators, finding that disturbing the top induced rock falls, now leave the top untouched and take up bottom instead to provide 7-ft clearance.

Butt entries are driven 1,800 ft long at right angles to the main entry. Rooms are 28 ft wide and 300 ft long, with 10-ft pillars left between rooms.

Normally, four men work in a room—a duckbill operator, his helper, a timberman who also cleans up for the duckbill, and a cutting-machine operator. A Jeffrey 35-L permissible-type cutting machine—the company operates 12 in the mine—undercuts the coal to a depth of 6 ft across the entire 28-ft face. After being undercut, the face is drilled halfway across from right to left with a hand-held electric drill and then is shot, Tennessee law permitting on-shift shooting. A Goodman power duckbill—the com-

pany owns 12 of these—then moves up and loads out the shot coal.

The left-hand half of the face then is drilled and shot down. While the duckbill is pulled back prior to moving into the left-hand side, the cutting machine is trammed across to the right-hand side, where it sumps in and starts another cut while the duckbill loads out the left-hand side of the room. The entire cycle across the 28-ft face takes about an hour. Steel jacks are set behind the duckbill until permanent posts are put in.

The power duckbills load onto Goodman shakers in the rooms and the shakers in turn discharge onto belt conveyors set up in the butt entries. In the main entries, Sanford-Day 4-ton drop-bottom steel mine cars—there are 75 of these at the Glen Mary mine—take coal from the belts and haul it to the surface. A hand-pulled, rubber-tired, three-wheeled Mine Safety Appliance Co. rockduster keeps rockdust applied along main and butt entries and to within 40 ft of the room faces. The face area is dusted manually to within a few feet of the face itself.

Use 60-lb Rail for All Track

For pulling mine cars inside the mine and out to the tipple, the Glen Mary Coal Co. has two 10-ton Jeffrey locomotives, one 8-ton Jeffrey and one 6-ton Goodman. The seam rolls slightly, with an average 3% grade against the loads to within about 1,000 ft of the portal, where the pitch increases sharply to about 10%. With a wet track or with temporarily slackened power, both

10-ton Jeffreys sometimes are needed to pull light loaded cars up this final grade. Sixty-pound rail is used on the haulageways and on the surface.

Power for all operations inside and outside the mine is brought from a TVA distributor. It comes in on the highline at 13,000 volts and is brought down to 2,300 volts at the local substation. Three 150-kw Westinghouse rotary converters located on the surface 150 ft from the portal provide 275 volts dc for work inside the mine. One safety cutout is installed at the drift mouth and the company plans to install additional safety cutouts at 1,000-ft intervals inside.

Air and Water Problems Solved

Ventilation is provided by a 6-ft Jeffrey centrifugal fan with six vanes. Brattice cloth at the working places and concrete blocks on the butt entries are used to split the incoming air. A concrete overcast 1,000 ft inside the mine on the main entry guides air to the first left and second right cross entries.

Up until January, 1949, no trouble was experienced with water underground. Since that time, however, small truck operators working adjacent properties have opened a considerable flow of water into the Glen Mary mine. To exhaust this water, a big sump has been dug on the main entry and two centrifugal pumps—a 6x7-in Cameron and a 4x5-in 4-RVL Ingersoll-Rand—have been installed to force water out to the surface at the portal, whence it flows by gravity into a good-sized stream some 200 yd dis-



DAY SUPERVISORS—T. Nix (left), mine foreman; Mike Jones, J. C. Coffee and Robert Mills, section foremen, supervise 60 men on first shift.



NIGHT SUPERVISORS—H. L. Wright (left), section foreman; Charles Hughett, mine foreman; D. L. Wright, section foreman; and Mynatt Hatmaker, fireboss, run the second shift.

tant. Also, two portable 1½x2-in LaBour centrifugal pumps are used inside when needed to pump water from working places to the sump.

Portable Tipple Installed

The Cedarapids portable tipple, built by the Iowa Mfg. Co., Cedar Rapids, Iowa, recently was added to the old tipple. The portable tipple was selected not because it can be moved easily from one location to another, though that certainly is a merit in some types of operation, but because it is simple, compact and easy to install and operate. Operating, like the old tipple, on 440 volts ac, it now is completely integrated with the old installation and a central control panel governs the entire crushing and screening operation.

The coal from the Glen Mary mine is not washed but is hand-picked, crushed to specified sizes and screened. The old tipple formerly loaded plus 6-in block, 6x3-in egg, 3x1½-in nut and 1½x0-in slack sizes. With the new set-up, run-of-mine enters the old tipple on a chain conveyor leading up from the dumping hopper just outside. Still in the old tipple, it passes over a double set of W. J. Savage shaker screens. Plus 6-in and 6x3-in sizes, after being hand-picked, pass directly from the screens into the loading booms of the old tipple and finally into railroad cars below.

All minus 3-in coal goes via a conveyor belt from the old tipple into the new tipple, where 1x½-in stoker coal and ½x0-in screenings are produced.

The portable tipple, as indicated

earlier, is a completely self-contained unit, compactly built and occupying little space, with belts, hoppers, screens and hammermill built in. Double-deck vibrating screens inside the unit take the minus 3-in coal coming in from the old tipple and separate it into 3x1-in, 1x½-in and ½x0-in sizes. A short belt conveys plus 1-in coal to the far end of the unit, where the built-in hammermill, equipped with 18 6-lb hammers, breaks the coal down to 1x0-in size. The crushed coal then is lifted by a drum-like rotary hoist onto a belt, which carries the coal back over the top of the whole assembly and delivers it again to the built-in vibrating screens, along with new 3x10-in sizes coming in from the old tipple.

Stoker Coal Is Oil-Treated

Stoker coal, 1x½-in, passes from the vibrating screen into one of two built-in hoppers and from there, through an opening at the bottom, falls onto a portable belt, which can be moved by hand from one side to the other of the assembly for greater loading convenience. From the belt, the coal is discharged into a vertical steel chute, built in the local shop, and thus delivered to railroad cars beneath, being sprayed with oil as it passes down. At the delivery end of the belt, a magnetic pulley draws out tramp iron and drops it into a special compartment, from which it can be cleaned out regularly.

The ½x0-in coal from the vibrating screens also falls into an open-bottom hopper built into the assembly and is discharged through a

chute into the car spotted below.

The entire portable tipple is driven by five electric motors, the largest being a 75-hp unit for the hammermill. Other motors drive the vibrating screens, the belt lines and the shaker feeders. Capacity is rated at 250 tons per hour of run-of-mine. Glen Mary engineers have installed a special additional belt to be used, when desired, for feeding the entire mine output, including plus 3-in sizes, directly to the portable tipple, thus producing stoker coal and screenings to the exclusion of everything over 1-in sizes.

The portable tipple has been housed in an auxiliary structure of corrugated steel joined to the old tipple. Four tracks and a run-around serve the combined tipple. Coal is shipped via Southern Ry.

The mine employs 60 men underground on the day shift and a like number on the night shift. Five men are employed at the tipple and six in the shop.

Top Men Assure Efficiency

Lewis Green, Harlan, Ky., is general manager; Fred T. Loving, Jr., Morley, Tenn., is operating manager; and C. M. Bengt, formerly associated with Walter Bledsoe & Co. operations at Morley, recently has been made local superintendent of the Glen Mary mine. Other top men at Glen Mary are T. Nix, day mine foreman; Charles Hughett, night mine foreman; C. J. King, chief electrician; and C. V. Owen, office manager. Aught Tippet, tipple expert at Morley, has been moved temporarily to Glen Mary to get the new plant going.



GO-NO-FARTHER LINE left by marking machine guides loading-shovel operator. Coal will not be buried by spoil from the next cut because the bench face is vertical and is left without saw-toothed edges to trap material.

Marking Machine Saves Coal

Slightly Modified Trenching Unit Increases Recovery an Estimated 200 to 400 Tons per Acre at Georgetown No. 12 Strip Operation—Vertical Wall Without Saw-Toothed Edges to Trap Material Reduces Loading Losses



MARKING LOADING LIMIT and providing a spoil dam for the stripping shovel are the functions of the marking machine shown here with trenching head raised.

SAVING an estimated 200 to 400 tons per acre previously buried under the spoil from successive cuts, the loading shovel at Georgetown No. 12 mine of the Hanna Coal Co., Georgetown, Ohio, now gets very nearly 100% of the coal with the help of a slightly modified trenching machine. Mine officials call it a "marking machine" because it provides the loading shovel operator with a go-no-further line.

Until recently, the loading shovel, moving in after a scraper or road patrol and a power broom had cleaned off the top of the coal, left a saw-toothed sloping wall on the coal bench. The stripping shovel, advancing on the bench behind the loading shovel, cast spoil from the highwall into the space left when the coal was loaded out. Naturally, spoil filled in the saw-toothed gaps in the coal bench wall. As a result, when the loading shovel made its next pass through the cut, a small block of coal, shaped like a right triangle erect on its short side, had to be left in the pit because it was too badly mixed or covered with spoil (Fig. 1).

The first attempt to solve the problem was to move the stripping shovel to the edge of the bench so that half of one crawler hung over (Fig. 2). This did not prevent



MARKING MACHINE in action cutting a 5-in-wide trench to the full depth of the coal seam at Georgetown No. 12 mine of the Hanna Coal Co.

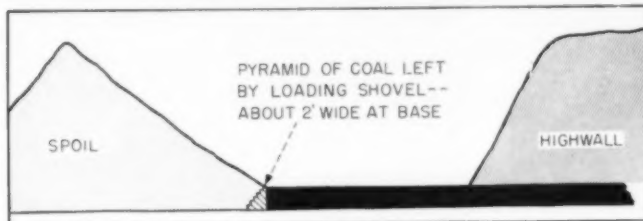


FIG. 1—LOST COAL buried by spoil with conventional stripping and loading methods.

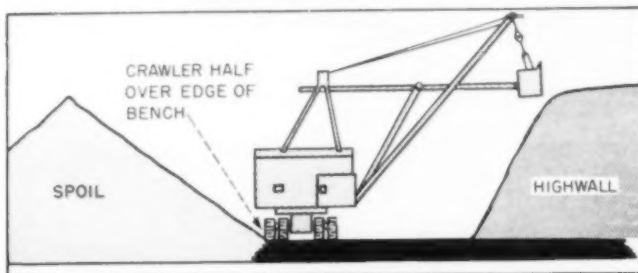


FIG. 2—FIRST ATTEMPT to keep spoil off the coal—setting crawler over bench edge.

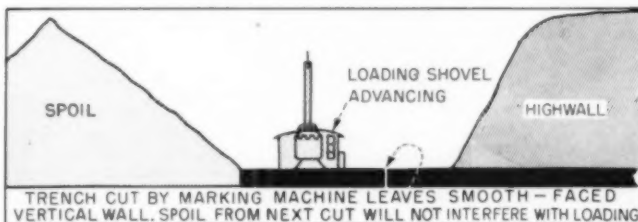


FIG. 3—PRESENT METHOD of keeping spoil off coal—trenching with ditcher.

spoil from filling in the saw-tooth sides, but did give the loader a better chance to recover more of the coal. However, stresses on the crawler while half of it hung over the edge of the coal bench added some complex maintenance problems. In short, though this method was better than anything previously tried, it clearly was not the real answer. The marking machine was a major improvement, although Dan Saxton, Georgetown superintendent, makes the point that the future may bring an even better answer to the problem.

The marking machine, powered by a Buda HP 326 gasoline engine, is a slightly adapted Barber-Greene trenching machine. Lengthening the trenching bar was the major modification. The bar now extends to a depth equal to the average thickness of the seam. Following the clean-up equipment—road patrol and broom—and going ahead of the loading shovel, the marking machine digs a 5-in wide trench to the depth of the seam. Usually the trench is dug parallel to the highwall, but if for some reason it is desirable to "feather off" the coal to be loaded, the trench may be curved off toward the spoil bank.

Nearly 100% of Coal Loaded

The trench marks the loading limit for the shovel and enables the operator to load out nearly 100% of the coal on his side of the trench, leaving a smooth vertical wall on the bench (Fig. 3). Since the wall is no longer saw-toothed, spoil cast into the cut after the coal is loaded does not interfere with loading of the next cut. Nor does it cause a small pyramid of coal to be left in the pit. As noted, an estimated 200 to 400 tons of coal per acre now is being loaded that formerly would have been left in the pit.

The marking machine normally advances at a speed of about 8 fpm but its speed and power may be varied as needed by a series of gears. The machine requires only one man. It is comparatively light and moves under its own power from place to place in the pit. For long moves, however, it usually is loaded aboard a semi-trailer and hauled to its destination.

Georgetown engineers still are experimenting with the marking machine, having tried several types of bit with varying success. As pointed out, the machine may not be the final answer, but until a better answer is found it is filling the need quite satisfactorily.

Broad Safety Program for Both Men and Officials Pays off at Red Jacket



TO FACILITATE TRAINING, suitable buildings are provided at each mine. The main building at Red Jacket is shown here, with the author (left) at the entrance with C. P. Ferguson, preparation engineer.



FOREMANSHIP AND MINING COURSES are followed by examinations, such as that shown here, held at company headquarters.



TO HELP THE SUPERVISOR, Red Jacket offers courses in human relations, public speaking and job relations.



MULTIPLE-MANAGEMENT PLAN, including junior board of directors, has as its aim helping both employee and company.



TWO SCHOLARSHIPS at West Virginia University are awarded to sons of employees each year through competitive examinations.



TRAINING IN FIRST AID AND MINE RESCUE are offered each year and also whenever there is a work stoppage. Four of the six company teams were winners in the 1949 meet of the Mingo County Mining Institute.

Training for Safety

Benefits of Safety Training Include Not Only Prevention of Injuries But Also Increased Efficiency—How Red Jacket Goes About Training and What the Results Are in Safety, Efficiency and Better Employee Relations

By J. J. PLASKY

Training and Safety Director, Red Jacket Coal Corp., Red Jacket, W. Va.

IN ANY training program, safety training should be the first consideration. At the Red Jacket Coal Corp. we believe that safety and efficiency go together, that the right way is the safe way, and that any proper training is basically a safety program. We make no distinction between the two.

Our safety-training program may be no better than certain others in the industry, but this summary of Red Jacket experience is presented in the hope that it will promote understanding of the actual benefits of safety training. Human lives can be saved, human misery alleviated and human relations improved. The importance of individual training will be stressed in this article, some experiences of other companies will be related and new methods of improving training will be outlined.

While the coal industry is active in sponsoring and organizing various forms of training, it has not devoted sufficient effort to one

phase particularly influencing safety and efficiency. I refer to the training of men at the face.

The Need for Training—You cannot train a man to be a safe worker without training him to be efficient. Training is vital. There is nothing wrong with our technical ability. We all know the progress that has been made in mining, particularly in the last decade. We have plenty of equipment and man power, but training is absolutely necessary to enable skill and leadership to keep abreast.

A decade or so ago the tools used to advance a room were a miner's kit valued at \$50, a few mine cars and a locomotive. Human muscle was the driving power and skill was secondary. Today a crew uses a cutting machine, loading machine, shuttle cars, locomotive, etc., with an estimated value of \$75,000 and requiring a high degree of operating skill. Head work and skill are the driving powers and human muscle secondary. In other words,

two machines are used—the human machine and the mechanical machine.

A number of manufacturers have spent considerable money and effort to develop the machine, but we have not expended a similar amount in either money or effort to develop the human machine. Yet, without similar progress, the mechanical equipment is a failure from the standpoint of safety and efficiency.

The Importance of Individual Training—Every coal company does some training, even if only by instructions passed down from top management. Some offer scholarships to develop engineers to carry on their work. That is right and commendable. Some have excellent training programs for foremen, and these too have their place in the training program. However, very few companies have organized training programs for the rank and file. At the same time, all of us are striving to get the utmost safety and efficiency out of these men.

In fact, all training, whether it be vocational training in high schools, scholarships in colleges, foremen training at the plant, or any other, is aimed to ultimately reach the man at the face—to educate him to work safely and efficiently. The man at the face is the payoff. It is he who is the main cog in any coordination of effort. However, he is also the weakest cog because, in many instances, we depend upon the foreman to train

Red Jacket Training Backed up by Top Brass and Systematic Planning



LABOR-MANAGEMENT DINNER emphasizes cooperation in promoting safety. It follows annual dinner honoring supervisors.



SAFETY-JINGLE CONTEST, being judged here, is part of campaign aimed at interesting employees and their families in safety.

him. The foremen are doing the job but they should have help.

During the past war the United States built a mighty naval and military organization. It was not done by training only the officers and then depending upon them to train the men. Training was carried down to the buck privates to make them specialists in their lines with the officers acting to coordinate their abilities. The invasion of France was a masterpiece of organization and carried out by highly trained men. All effort had to be coordinated to assure success. Training really paid off. If millions of men can be trained to carry out such a project, then the 500,000 men in the bituminous industry also can be trained to work safely and efficiently. However, let us see what is being done.

During a mine inspection I observed a man at the controls of a mobile loading machine. He was perspiring freely and very nervous.

Obviously he was learning to operate the machine. All the posts within 20 ft of the face were knocked out, and everyone was extremely cautious in approaching the vicinity. There was no doubt that this man was creating hazards and certainly he was not loading much coal. He was costing the company much more than would have been the cost of training him.

Here is another example: A safety committeeman reported what he thought was a hazard to a foreman, who ignored the complaint and told the committeeman he didn't know what he was talking about. This remark was costly because the men quit work.

Training Programs Elsewhere

—Both the preceding examples stress the need for training in handling both men and equipment. More and more companies realize its importance and are doing something about it. Some have very elaborate programs under the di-

rection of capable training personnel. There is at least one company that has set aside sections of the mine in which men serve a sort of apprenticeship before being assigned to regular duties.

Other companies train by lectures, conferences and other methods to give these men the mental abilities to fit them for this mechanical age of mining. One company in the iron-ore region adapted an old warehouse for training purposes. Exact underground conditions were reproduced and regular equipment was provided. When a new man was hired, he was required to demonstrate and develop his ability to properly and safely operate the equipment that he was to use. After this period of training was completed (it lasted from 1 to 10 days), the man was ready to take his place in the organization underground, and he fitted in perfectly with no danger to himself or to others, and with the utmost efficiency.

Training results in improved safety and efficiency. You can't train a man to be a safe worker without increasing his efficiency. Another reason why training is more important than ever is the change to a competitive market which makes the control of costs more imperative. However, the results of training are intangible and, because of market conditions, the management of some companies may think that training is not necessary. Nothing could be more fallacious. In fact, that is when training is more necessary.

Training at Red Jacket—Policies pertaining to the management of the company are formulated and approved by the general manager, president and chairman of the board. There is a definite policy pertaining to the training of employees which reads:

"It is recognized that the training of all employees, both to better fit them for their current positions and to qualify them for more responsible positions, is most vital. This training, naturally, divides itself into two basic parts, both of which require the fullest attention of all employees.

"The first is formal training in organized classes, taught by experienced and qualified instructors. The training department is responsible for this aspect and shall make available the maximum range of subjects with the latest training aids and techniques.

"The second is informal on-the-job training and instruction, which

REPORT OF UNSAFE CONDITIONS

Superintendent _____ Date _____
 Gen'l Mine Foreman _____ Mine _____
 Mine Foreman _____ Section _____

The following unsafe conditions or practices or rule violations were observed by me and are referred to you for correction and report on the bottom part of this sheet: _____

Air Reading: _____ C.F.M.: _____ Gas Detected: _____
 Recommendations for the correction of above are: _____

Signed: _____
 (Safety Inspector)

The above have been corrected as follows: _____
 Date Corrected _____

Signed _____
 (Superintendent)

Returned _____

INSPECTION RESULTS, recommendations for correction of unsafe practices and action taken thereon are brought together on this report form developed by Red Jacket.

is the direct responsibility of all classes of supervisors. This second phase is to have the fullest support, advice and assistance of the training department, with a view to broadening its range and increasing its effects."

This policy definitely outlines the training procedure. All department heads and the mine management cooperated fully. Three years ago a training director was employed at Red Jacket. He was invested with the duties of instituting a long-range training program, some of the objectives of which were:

1. Training men to fill higher positions.
2. Spotting prospective supervisors.
3. Improving human relations.
4. Reducing accidents.

All of us have these objectives, which have a direct bearing on each other because one could not be improved without improving the other. It was obvious that all of

the objectives could not be attained in a short time and that it would not be practicable to begin training in all directions at once. Therefore, it was decided to concentrate on safety training.

Inasmuch as safety and efficiency were linked together for training, the training director had direct charge of the safety-department personnel. This set-up in no way interfered with the safety activities, but in reality helped them.

Buildings suitable for training were constructed or made available at all plants of the company. These buildings are used for meetings, instruction and training. At times during the year when training is in full force, the buildings are used every day and most of the time two classes are held, one for the day- and one for the night-shift employees. A building designed especially for training was constructed at Red Jacket. It is of cinder-block construction and partitioned

into two rooms and a garage on the first floor. Showers and toilet facilities are provided in the basement. The assembly room is 19 ft 4 in by 30 ft 3 in; work room, 11 ft 6 in by 16 ft 10 in; garage, 16 ft 10 in by 18 ft 3 in. The garage was made large enough for storage of mine-rescue equipment, first-aid supplies and other equipment.

Setting up a systematic training plan was the next step. The plan had to be flexible so that changes could be made quickly to suit such conditions as slack time and stoppages, when the training activities could be increased. Visits were made to other plants where training was in progress, conferences were held and information received from training specialists, colleges, government agencies, insurance companies and others. Each contributed something.

Several good outlines for training were available from these sources. However, they had to be revised to fit into the training program for the coal industry. As a rule, the available outlines contemplated work for the supervisors only. Very few outlines of courses on safety were available for teaching to the employee below the rank of supervisor.

After making a survey of the training needed, classes were organized. The subjects chosen to be taught were: first-aid, mine rescue, mine foremanship, general mining, accident prevention and human relations. These were taught by instructors of the U. S. Bureau of Mines, W. Va. University Extension Services, special instructors and selected local instructors. The classes were arranged so that there was little or no overlapping, and each phase of training was completed before another was started. Conferences, lectures, visual aids and other methods were used to put over the subjects.

The most popular of these courses was the subject of human relations, which was taught by the conference method under the leadership of a local supervisor. Local case histories were discussed. In addition, a course on human relations and public speaking also was made available to the employees.

Standard first-aid training courses were offered to the employees and started off with about 600 men completing the course. This course is offered each year and, also, whenever there is a stoppage of work. First-aid training is given at least once each year to all foremen whether they have re-

Varied and Well-Organized Training Program at Red Jacket Succeeds in . . .

ceived previous training or not. Motion pictures on first-aid training are shown to the people and school children of the communities. Interest is steadily increasing.

Men selected for mine-rescue training are trained by Bureau of Mines instructors. Retraining is done by local instructors. First-aid and mine-rescue teams are selected and trained for competition. On Sept. 24, two mine-rescue and four first-aid teams were entered in contests sponsored by the Mingo County Mining Institute. Four of the six teams were winners, one taking first place and receiving the trophy.

Classes in mine foremanship and general mining were arranged so that men working on either the day or night shifts could attend. These classes were taught by local and W. Va. University instructors and were open to all employees. The objective of this training was to prepare employees to pass the state examination for certificates as foreman and to prepare foremen for upgrading.

Arrangements were made with the W. Va. Department of Mines to hold the mine foremen's examinations at Red Jacket after completion of the training. This plan made it convenient for the applicant to take his examination and saved him travel and hotel expense. It also increased the interest in the classes.

During 1947 and 1948, two sessions of two hours each were held twice a week continuously. The classes were suspended during the summer of 1949 but have now been resumed. These courses may be considered fundamental in the training program. However, they created more interest because the number of employees taking the courses made it imperative for the foremen to obtain a better knowledge of mining also. Consequently, a large number of the foremen attended the classes.

The human-relations and public-speaking courses were presented to selected supervisors and department heads. The purpose of these courses was to increase the supervisor's knowledge of human relations and to improve his ability to express himself. A certified instructor taught this class, one three-hour session once a week for 20 weeks.

Job-relations training is primarily a method for analyzing and handling any form of human-relations program. The course consists of five two-hour conferences, which

usually are attended by 10 trainees. Fifteen instructors received a special course which is much more extensive than the program given supervisors and which has qualified them as trainers.

The first part of each job-relations training course consists of a talk on general principles by the trainer during which he uses black-board illustrations. However, most of the time consumed in the course is devoted to case illustrations. Each member of the conference group presents a human-relations case from his own experience, and the group develops a solution based on the principles listed on the job-relations card. Every supervisor, including the general manager and nearly all department heads of the company, took this course.

The policy of the Red Jacket Coal Corp. has always been to help its employees better themselves. The company also believes that good human relations stem from the desire to see people improve themselves in their position and be happy in their daily work. In 1947, the company instituted a system of multiple management, modified from the McCormack system, which is basically personal development of the individual, especially in the fields of initiative, analytical ability, human relations and the capacity to assume responsibility.

The objectives of this plan were: (1) training promising men in supervisory capacities for higher positions and responsibilities; (2) bringing out the thoughts, ideas and suggestions of all supervisory personnel for improvement of the business; (3) promoting departmental cooperation and goodwill by increasing understanding of the part each plays in the business as a whole; (4) supporting and promoting development of likely supervisory candidates among the labor ranks.

The multiple-management plan includes a junior board of directors and a mine board of review. The junior board of directors is composed of supervisory personnel and holds regular meetings for free and open discussions of all phases of the business and the development of recommendations for methods designed to better the business. From 5 to 10 members of this board may be changed by election each six months. The recommendations of this board are submitted to the mine board of review for approval.

The mine board of review is composed of 10 higher-level management officials and is permanent in

nature. Its duty is to review the recommendations of the junior board of directors and put into effect, with the authority of the general manager, the worthy recommendations, or advise the junior board why certain recommendations are not feasible or practical. Both boards meet once a month. Since the inception of the plan, 89 recommendations have been considered.

The company also has a plan of awarding two scholarships to the sons of employees. The scholarships cover a four-year course at W. Va. University and provide \$600 for each year. The successful candidates are selected by a member of the staff of the university as a result of competitive examinations. They are given summer employment, which is planned to provide them with the best practical knowledge of the different aspects of their profession. Each student is assigned to work in a different department each year. The results of their summer work are analyzed and forwarded to the university.

The training and safety department, headed by a director, has charge of all training and safety work. Other personnel include a chief safety inspector and three safety inspectors. The chief safety inspector supervises the work of the safety inspectors and assists the training and safety director.

The aim of the safety and training department is to be progressive. Such developments as the "pin-up" method of roof support, the use of aluminum crossbars, the effect on roof of changes of temperature, and various methods of timber recovery have been the subjects of special studies or experiments.

The duties of the safety inspectors are to inspect the mines and report unsafe conditions, assist in training, attend safety meetings and promote safety in general. The safety inspectors have headquarters at different mines. Inspections are alternated so that in time all inspectors visit the different mines. This plan tends to increase the efficiency of the inspections and also enables the inspector to gain a more varied experience. Improvements are effected by means of discussion on the job or with the local mine management. Records are maintained of unsafe conditions and the date of their correction.

Accident records are maintained on four standard forms: (1) an honor roll listing the names of all foremen without a lost-time acci-

... Cutting Accidents and Promoting Better Efficiency and Worker Relations

dent, (2) a monthly report listing the names and number of accidents charged to each individual foreman, (3) a second monthly report listing the accidents by causes and indicating the comparative rating of the various mines, based on a weighted value of 80 for frequency and 20 for severity, (4) a third detailed monthly report indicating how accidents occurred and to whom. These reports are compiled from the standard report submitted by the mine foreman. The four reports make a complete accident record from any standpoint.

An annual safety dinner is held to honor and give recognition to the foremen who have supervised sections without a lost-time accident during the year. This affair is followed by a labor-management dinner, which is attended by the safety committees, local and district officials of the UMWA and officials of the state Department of Mines and the U. S. Bureau of Mines.

The safety committees and officials of the UMWA have been very helpful in our safety program. Most of the members of the safety committees have received training from Bureau of Mines instructors and all have taken an active part in the safety program.

A magazine is published monthly by the company and distributed to the employees. Articles and pictures on safety and training are featured. The magazine has won recognition from the National Safety Council for two consecutive years. Other methods designed to promote safety are annual safety-slogan, safety-jingle or other such contests for employees and school children. Judging from the large number of entries submitted, these contests are quite popular.

Results of Safety Training—Interest in safety training was built up gradually by convincing the employees that the training was made available for their benefit. In this respect, top management aided materially by attending and participating in some of the conferences. Other incidental activities in safety, such as safety meetings, dinners, etc., helped materially to create interest.

Accidents have been reduced at Red Jacket mines. However, it is believed that no single activity was responsible but rather a combination of all activities and the co-operation of all concerned. Falls of roof cause over 50% of all accidents in coal mines. Yet two mines with a daily production of over 3,500

tons of coal had only two slight accidents each from this cause in 1948, and to date this year each has had only one such accident. Results such as these can be achieved only by the teamwork of everyone. The personnel of the U. S. Bureau of Mines, the state Department of Mines, various state educational institutions and others were very helpful in putting over the safety-training program at Red Jacket.

In this safety-training program the surface has only been scratched even though the results have been very satisfactory. During the three-year period, the number of accidents has been reduced 52% and the severity rate 87%. The number of foremen supervising sections without a lost-time accident for an entire year has increased steadily; 22 in 1946, 47 in 1947, 79 in 1948 and 140 in the period Jan. 1-July 31, 1949. A total of 975,000 tons of coal was mined from sections on which not one lost-time accident occurred during 1948. There has not been a fatality at any of the mines of the Red Jacket Coal Corp. for one year ending Aug. 9, 1949. During this time 2,800,000 tons of coal was produced from underground mines and 317,000 from strip operations. The company received three citations for outstanding safety records for 1948.

Many factors enter into improvement of labor relations at any plant and it would be presumptuous to credit training alone with bettering labor relations at Red Jacket, but it is interesting to note the absence of major labor difficulties since the training program started. Over a two-year period there has been a 50% reduction in the number of man-days lost due to stoppages other than national, and two mines have operated two years and one mine one year without a single work stoppage.

Improving Training—The selection of the courses to be taught has a direct bearing on the success of a safety-training program. However, many of the available courses are designed for general industry and do not fit into training in the coal industry. Many are out of date. The various educational institutions are doing a good job in this respect. One institution in a major coal-producing state is revising its training outline almost continually. However, another institution in another major coal state has not revised its outline for a number of years, despite the changes in the coal industry.

In some areas, the lack of quali-

fied instructors has been considered a bottleneck. This is not as great an obstacle as it seems, as has been proved by the experience of the U. S. Bureau of Mines. This agency started a program of teaching accident prevention to members of the safety committees and to supervisors of the coal industry. The need for qualified instructors was urgent. They recruited the instructors from their personnel—men who may have been only recently employed at a mine. These men are doing a good job in training.

Motion pictures, film strips, slides and other visual aids are considered good training tools and among the best methods of putting over a subject quickly, clearly and interestingly. They proved their worth in the training of the armed forces during the last war, yet these excellent training tools are sadly lacking in the coal industry.

The U. S. Bureau of Mines has a film library of over 225 films, but there are only six on first-aid and safety and about five films pertaining to the coal industry. The last are old films that have been revised. The National Coal Association has about two. There are several others of a general nature available from other sources. One of these is entitled "Modern Coal Mining." This film shows the operation of a mine and depicts the machine crew wearing cloth caps and carbide lamps and shows the men smoking.

In a catalog listing over 1,000 films there are only 13 pertaining to coal and many of these are not suitable for training purposes. On the subject of safety, there are literally hundreds of films available pertaining to many other industries, but very few, if any, dealing with the coal industry. Very few films are available on the most popular subject—human relations.

To improve this situation, the coal operator, in the interest of safety, can and should demand that the tools be made available to help train men to work safely. Individually, the operator may not be able to provide these tools, but the federal and state agencies, educational institutions and coal operators' associations can. You have heard about some of the good results achieved by the use of the available training tools and you know that a far better job can be done with better tools. Let's get them and expand this safety training, which means so much to the men, their families, management and communities of the coal industry.

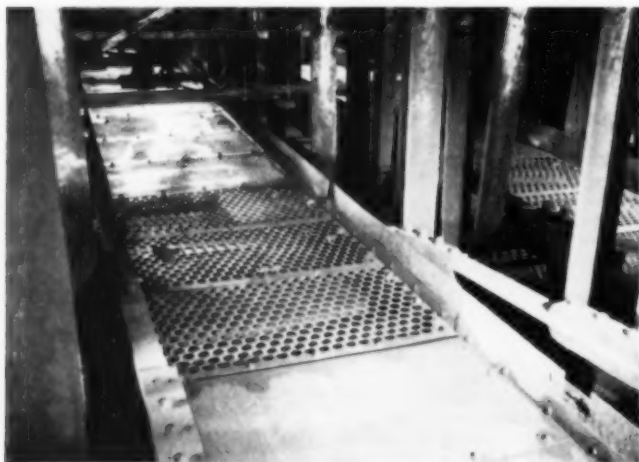


EQUIPPED WITH STAINLESS-STEEL SCREENS for lower-cost classifying of a higher tonnage, this modern plant is typical of those now being erected in an acceleration of the trend toward better coal preparation.

How Stainless Steel Improves

Higher Preparation Standards, Reflecting Increasing Demand for Better-Quality Coal, Emphasize Screening's Importance—What Stainless Steel Offers in Improving Cost and Quality Results with Perforated Screens

By CHARLES G. PURNELL
Carnegie-Illinois Steel Corp.
United States Steel Corp.
Subsidiary
Pittsburgh, Pa.

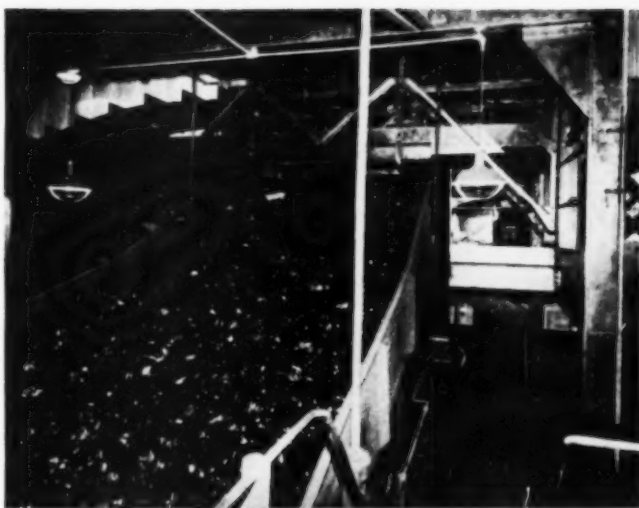


PARRISH-TYPE classifying and dewatering screen equipped with stainless-steel perforated plate for longer life and better results.

PERFORATED stainless-steel screens stand up better and provide much longer service life under severe operating conditions than screens made from other materials. Test data accumulated over a period of years definitely establish the superiority of stainless steel for screens in various types of service, including refuse shakers, dewatering and desanding units, wet-sizing tables, air-cleaning tables and chemical-treatment systems.

Heretofore, stainless steels have contributed toward longer life, more efficient operation and reduced maintenance on many types of coal-mining and handling equipment. Typical applications include bottoms for loader conveyors, shakers and chutes, line-conveyor bottoms, pumps shaft, woven-wire screens, fans handling hot air and stack liners for dryers, to mention a few.

Recent developments in the coal industry have accelerated an al-



LONGER SERVICE LIFE, as compared with other materials, is provided by stainless-steel perforated screens. Most popular grades are 12 and 18-8.

Screening Results

ready increasing trend toward more widespread adoption of modern coal-preparation methods in both the bituminous and anthracite fields. One of these has been increasing pressure from the customers of both deep and strip operators for a higher quality coal

which is lower in ash, sulphur and moisture contents and, also, more closely sized.

The introduction of more highly mechanized mining has, in many cases, resulted in a high percentage of small sizes and fines which require special equipment for clean-

ing, sizing and drying if they are to be marketed successfully. Another significant development has been the mining of marginal seams by both deep and strip methods, which frequently requires extensive cleaning and sizing before the coal is marketable.

As more and more modern preparation plants have gone into operation, it has become evident that one of the most important fixed costs is maintenance and replacement of perforated screens. This is particularly true of the screens with smaller openings used in dewatering and desanding, as well as in sizing operations. Such screens encounter severe abrasion from coal, sand and refuse. In addition, the screens often are subjected to corrosive attack from acid mine water used in processing and cleaning. Intermittent operation can cause rusting, which may result in "blinding" or blocking of the small perforations.

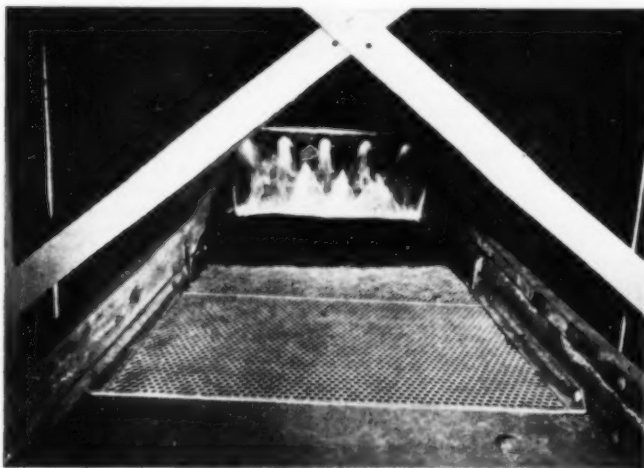
The foregoing considerations have led to the wide and successful use of stainless steel in perforated screens to replace other materials incapable of meeting as economically the severe service requirements imposed in classifying and cleaning enormous tonnages of mine products.

Advantages of Stainless-Steel Screens—Erosion through the abrasive action of coal and refuse is the biggest cause of failure in perforated screens. Stainless steel is inherently tough and resists abrasion well.

Coal-preparation screens must maintain perforation size to be efficient. Holes resulting from wear permit oversize material to pass through. Because stainless-steel screens resist abrasion, perforation size is maintained.

Perforated screens used in sizing and dewatering coal are efficient only as long as a substantial part of their perforated area remains open. Because stainless steel resists the corrosive action of acid mine water, perforations remain clean and smooth. Thus, there is less danger of "blinding."

Stainless steel is strong and tough. Consequently, screens can be made thinner and lighter than those made from other materials. Because they are thinner, stainless-steel screens are more efficient since the holes have less tendency to "blind" than those in thick screens. Because they are lighter and possess less inertia, they reduce wear and tear on the machinery in



DESANDING UNITS on the bottom deck of this shaking screen are made of stainless steel for more accurate screening over a longer period.

vibrating and shaking services. Thin screens fabricated from stainless steel retain their shape in spite of heavy loads.

A common difficulty with carbon-steel screens is that, after a shut-down, they must be cleaned to restore the smooth finish essential to good operation. Because stainless steel resists corrosion, it stays smooth under normal conditions despite intermittency of operation.

Since these and other advantages of stainless-steel screens result in much longer life than those fabricated from other materials, fewer replacements need to be made when stainless-steel screens are used. Shut-down time is reduced to a minimum—an especially important advantage when small-size bottom-deck screens must be replaced on cleaning and sizing equipment.

Suppliers of perforated coal screens for preparation plants can furnish the grade of stainless steel best suited for a particular operation. USS 12 (Type 410) is the most popular. Where extremely corrosive conditions are encountered, many operators are using USS 18-8 (Type 302).

Stainless-steel screens can be supplied with virtually any type and size of perforations. Round, square or slotted openings as small as needed in coal-preparation work, and in various designs, can be made when fabricating the screens. Although screens with opening up to $\frac{3}{8}$ in are the most used, recent service tests indicate that stainless steel is the most economical in the long run for screens with holes as large as 3 in.

Typical Anthracite Application

Operations at one plant in the anthracite field involve the processing of coal containing large amounts of acid mine water. USS 18-8 (Type 302) stainless steel was selected for use in equipment at this operation because this grade has both high resistance to corrosion and superior resistance to abrasion.

In the bronze screens formerly employed, there was a rapid reduction in thickness and the round holes became elliptical prematurely.

Jackets used on bottom decks of refuse shakers in the breakers at this operation are the most consistent testing point for screens, since these jackets are used for dewatering and desanding. This is a most severe service condition, combining corrosive with abrasive action. The following table compares jackets used in this service.

Average Life of Perforated Screens Used as Jackets on Refuse Shakers for Anthracite Coal

Screen Material	Average Life, Hours
Common steel	310
Bronze (punched slots).....	245
Bronze (milled slots).....	941
USS 12	1,156
USS 17	1,471
USS 18-8	1,506
USS 18-8 Perisertread perforated jackets	2,902
Copper-silicon alloy	1,049

In another service test involving 14- and 16-gage 36x72-in screens with 3/32-in round holes, the following results were obtained:

Screen Material	Average Life, Hours	Cost per Jacket	Cost per Hour
USS 18-8	8,291	\$44.96	\$0.0054
Copper-silicon alloy	3,647	32.79	0.0090
Manganese-bronze	700	40.57	0.0580

At the end of this test the stainless-steel screens were still in service.

Stainless-Steel Perforated Screens in Bituminous Mining—

One deep-mine operator in the bituminous field uses refuse shaker screens made of $\frac{1}{8}$ -in-thick USS 12 (Type 410) stainless steel with $\frac{3}{8}$ -in square holes. One of these screens was installed Oct. 6, 1947, and removed June 14, 1948, after the severe service of dewatering 152,000 tons of refuse material had finally enlarged the holes in the screen beyond effective size.

On another installation using screens of the same thickness, size and area, a screen made of USS 18-8 (Type 302) was operated by the same cleaning plant from Nov. 4, 1947, to Dec. 12, 1948, before increased hole size resulting from wear made replacement necessary. During this period the screen handled 265,000 tons of refuse.

At a large strip mine USS 18-8 (Type 302) stainless-steel stepped screens are used for dewatering and sizing 1 $\frac{1}{4}$ -in stoker coal. These screens are 12-gage with slotted holes ($\frac{1}{4}$ -in round-hole equivalent). Coal has been handled at a rate of 12,000 tons a week over these screens and, upon inspection after five months of service, there had been no clogging or appreciable wear. These screens carry a 3 $\frac{1}{2}$ -in coal bed.

Stainless-Steel Screens for Wet Sizing—

A bituminous mine shipping an average of 2,500 tons in a 24-hr day operated 240 days in 1948 with 50% of the coal going through the washer. It is conservatively estimated that at least 300,000 tons a year actually goes over the stainless-steel screens. These screens are of USS 12 (Type 410) steel and are 12-gage with $\frac{1}{4}$ -in holes. A number have been in service for slightly over three years, which means that approximately one million tons of coal have gone over them.

It should be noted that these stainless-steel screens are employed in wet sizing, which is harder on screens than dry sizing because of the tendency to plug. No trouble with plugging has been encountered.

Screens in Cleaning Systems

Using Calcium Chloride—An operator using calcium-chloride cleaning units employs at three mines 12-gage USS (Type 410) stainless-steel screens with $\frac{1}{8}$ x1-in slots. These screens operate submerged in a circulating calcium-chloride solution. USS 12 screens in this location have operated satisfactorily for between three and four years, compared to three to four months with carbon-steel screens.

Stainless-Steel Screens for Air-Cleaning Tables—

A very definite comparison of 26-gage stainless-steel perforated screens against similar screens of bronze on air-cleaning tables is provided by experience at another mine.

Here, on coal going over the air-cleaning tables, the 26-gage bronze screens lasted 41 days at three shifts a day, for a total of 89,000 tons of coal processed. The 26-gage stainless-steel screens lasted 159 days at three shifts a day, for a total of 322,000 tons of coal processed. Cost per ton of coal cleaned using bronze screens was 0.0022c; stainless-steel screens, 0.0009c.

Many other instances could be cited to demonstrate the superiority of stainless-steel screens. Results comparable to the foregoing have led at least two major builders of coal-preparation plants to adopt stainless steel as standard for dewatering and desanding screens. This endorsement is paralleled by the decision of numerous operators to change all dewatering and desanding screens to stainless steel when the first replacement is required in new equipment supplied originally with other type screens.



SYNTHETIC LIQUID FUELS—coal opportunity but also a problem requiring careful study and concrete action on various fronts if the industry is to benefit to the fullest from development and production.

Coal: Fallacy and Fact

Why Coal Should Take a Closer Look at Its Competitive Position and What It Should Be Doing in Research and Otherwise to Protect and Promote Present and Future Markets, Including Utilities and Synthetic Liquid Fuels

By REED MOYER

Assistant to the Vice President, Central Indiana Coal Co.

THROUGHOUT its long history, coal has been a feast or famine industry. The feast of the last eight years has made us unduly optimistic and dulled our business senses. Credulously, we have accepted the distorted picture of our economic future which has been painted for us during the past two years by various authors and industry spokesmen. Three of the reasons we are led to believe that the years ahead of us hold great promise are:

1. We are blessed with a 3,000 years' supply of coal.
2. Oil and natural-gas reserves are dwindling, opening up a vast new field—the manufacture of synthetic fuel from coal.
3. Anticipated increases in elec-

trical energy output in the United States presage a vastly expanded utility market for coal.

If we accept these three premises at face value, it would appear indeed that the industry is entering into a great new era. But a closer examination of these bases of optimism reveals an absence of concern for the immediate future, a lack of unified industry action to improve its competitive position, and an abundance of wishful thinking.

First, we should check the false optimism about the future of coal based solely on estimated reserves. The preponderance of coal supplies over those of oil and gas assures coal a promising long-term future.

But, to be realistic, we should examine closely coal's short-term future—the next generation—when oil and natural gas, whose productive capacities have been increased immensely during the past few years, will be probing in all directions seeking new markets. Our plans for at least the next two decades should allow for keen competition from these fuels.

Second, and closely correlative, we should investigate the belief that our oil and natural-gas reserves are rapidly coming to an end. When these two fuels began to give coal strong competition, solid-fuel interests pointed to authoritative statistics as "proof" they would soon be rid of this competitive challenge. But such statistics were, and are, inconclusive. For example, a National Coal Association table estimating proven United States' crude-oil reserves shows that in 1937 we had a 10 years' supply of this fuel. Further examination of this table indicates that in 1947 we had a 12 years' supply! In other words, the decade ending in 1947 saw new discoveries of oil outstripping production.

A study of natural-gas reserves and production statistics reveals

Research a Vital Factor in Enlarging the Future Coal Market

virtually the same situation. From these facts it is obvious that what are being depleted are only our *proven* reserves of oil and gas. There is valid evidence of the existence of abundant *undiscovered* reserves, and it is these we must reckon with in the coming years.

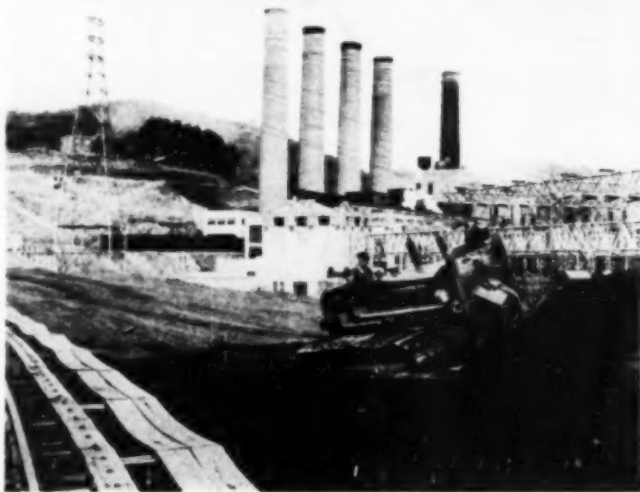
Nevertheless, there is a limit to oil and gas resources. Because of this, science is working on the development of synthetic liquid fuels to supplant our natural supplies. Every day there is increasing evidence to support the belief that this synthetic-fuels industry holds a great future for coal. Already \$30,000,000 of government money has been appropriated for research and development of synthetic fuels, and several Fischer-Tropsch and hydrogenation pilot plants have been erected and operated to demonstrate that a good grade of oil and gasoline can be successfully synthesized from coal. Further experimentation should materially improve the product and reduce its cost.

But the future in this field lies with coal the resource—and not necessarily with the coal industry as we know it today. This is a point, and a vital one, which many operators have blindly failed to consider.

Company Size Limiting

Most coal companies are not financially capable of entering an industry of the magnitude of the synthetic-fuels field. This industrial activity, by its very nature, requires enormous sums of capital and large reserves of contiguous coal. Yet, with very few exceptions, the coal industry is made up of a large number of moderately small companies with limited capital resources. The Pittsburgh Consolidation Coal Co., for example, largest commercial coal company in the world and considered to be a colossus in the industry, produces but 5% of the nation's coal.

Assuming that synthetic fuels are developed by private enterprise and not by the federal government, it is possible that not the coal industry but the oil industry, composed of a relatively small number of industrial giants, might foster its development. Oil companies are seeking the cheapest and most practical way to produce oil and gasoline by artificial means, and if conversion of coal to these products by synthesis proves to be the best way to obtain them, then we might very well witness the development of a



POWER GENERATION—growing coal market but not necessarily completely competition-proof. Recent short-term developments point up the need for aggressive action to meet increasing pressure from oil and natural gas.

system of captive mines owned and operated by oil companies. This system would parallel the present steel situation, in which the largest companies obtain metallurgical coal from their own mines rather than on the open market. To forestall the loss of our share in this endeavor to the oil industry, we should find ways and means of entering the field ourselves.

Third, we should look more closely at the optimistic estimates of utility coal consumption for the coming years. Conservative figures compiled by the Edison Electric Institute purport to show that coal consumption by electric utilities in 1961 will total 153,500,000 tons annually on the basis of anticipated increases in electrical-energy output. Other predictions envisage a market of 350,000,000 tons yearly for coal within the next several decades. These estimates are based on the relative share of the utility market which coal has captured during the past few years.

The coal industry has taken for granted that its utility sales will increase in direct proportion to the increase in electrical-energy output. The possibility of oil and gas capturing a larger proportionate share of this lucrative market is given little consideration.

Current statistics, however, point up the need for studying the recent short-term trend of utility fuel pur-

chases. Despite warnings by coal men and disinterested conservation experts condemning the use of precious gas and oil as fuel under boilers, this "wasteful" practice continues at an increasing rate. Federal Power Commission reports show a reduction in the consumption of coal and an increase in the use of both oil and natural gas by electric utilities in the first seven months of 1949 as compared with the same period in 1948. Coal consumption totaled 49,635,000 tons from January through July, 1949, an 11.4% decrease from the 56,011,000 tons used in the 1948 period, while the use of oil jumped 29.7% from 25,555,000 to 33,150,000 bbl.

The use of natural gas rose 15.9% from 252 to 292 billion cu ft for the same months in the two years. If these figures are a portent of the future utility fuel-market structure, then the coal industry should reappraise its estimates or, better still, take aggressive action to meet the challenge.

The preceding facts and observations reveal several misconceptions prevalent in the minds of a large segment of the coal industry. The lush war and postwar years have permitted us to forget the cruel lessons of the 30's—lessons which must be relearned and improved upon to aid us in the competitive battle for fuel dominance. To maintain or better its position relative

to oil and gas, the coal industry must stop rationalizing and formulate a progressive plan of action.

We must carry out a much larger research program than the one now meagerly supported by companies producing scarcely one-third of the nation's coal. These companies, mining approximately 200,000,000 tons of coal annually, contribute $\frac{1}{4}$ ¢ per ton, or a trifling total of \$500,000, to Bituminous Coal Research, Inc., the industry's research organization. In contrast, it is estimated that the oil industry spends upwards of \$100,000,000 annually and employs over 15,000 persons on research. One oil company alone, Standard Oil of New Jersey, spent \$18,200,000 for the development of new products in 1948, or 36 times the amount contributed to BCR by the entire coal industry.

One method of comparing research activities between industries is to determine the ratio of research expenditures to gross sales. A 1940 survey by the National Association of Manufacturers brought out the following, based on replies from 5 to 47 companies in each group:

Median Expenditures on Research as Percentage of Gross Sales by Industry Groups

Chemicals and allied products...	4%
Miscellaneous industries	3%
Machinery (exclusive of transportation equipment)	2%
Transportation equipment	2%
Stone, clay and glass products... 1½%	
Paper and allied products.....	1%
Iron, steel and their products (exclusive of machinery).....	1%
Non-ferrous metals and their products	1%

In addition to the coal research carried on by BCR, some individual companies have their own research programs, but it is doubtful if the amount spent by the industry on this combined research totals more than one-tenth of 1% of the annual volume of gross sales.

Clearly, here is a sphere of activity which can be vastly improved by concerted far-sighted action on the part of the coal industry. It takes vision to justify a large expenditure for results which may not be realized for a year, five years or 10 years hence. How far along would the diesel engine be today if those interested in its development had refused to set aside enough money to insure adequate research? Could the oil industry have promoted its own welfare more effectively than by scientific research on the diesel engine?

Whenever coal men discuss the industry's research program, many of them deprecate BCR's work on the ground that it is devoting too much time to research connected with domestic-fuel consumption, or that it hasn't shown many tangible results and its activities are too limited. The answer to the first of these criticisms is obvious to the man with vision, and that is that anything which aids the whole industry directly also helps each individual operator indirectly. A ton of retail coal saved by the coal industry from oil and gas competition relaxes the competitive pressure on the operator seeking other markets.

Effective Research Costs Money

The other two criticisms arise out of the false hope that we can get something for nothing in the matter of research. It is no more true in this field of endeavor than in any other. Effective research requires large amounts of patience, energy and, above all, money. The industry should take immediate and positive action to raise more money for a really effective research program, and those companies which are not now contributing should be persuaded to carry their share of the load.

Next, the coal industry should undertake an independent appraisal of the future of synthetic-fuel production, with specific reference to the role open to the coal industry as we know it today. Does synthesis of oil and gas from coal require capital outlays beyond the reach of today's small coal companies? Must we resort to amalgamations of existing companies, or can new methods of financing be utilized to develop this vast industry? What part will the large oil companies play in this development? Where does the federal government fit into the picture? These are only a few of the many questions that must be answered before we can determine what role, if any, we are equipped to assume. The coal industry should appropriate, through the National Coal Association, sufficient funds to enable a group of competent, disinterested consultants to unearth all the data pertinent to our entrance into the synthetic fuels field.

The Army Engineers have let a nation-wide contract with a large engineering firm to determine suitable general areas for the manufacture of synthetic fuels. Availability of raw materials, transportation, water supply, power, labor, housing

and markets are matters covered by the survey. This study is a step in the right direction and its findings should be scrutinized by the coal industry. It does not, however, probe into the economics of fuel synthesis with regard to coal, which is of great concern to all the industry.

The final recommendation is a course of affirmative action to insure increased participation in the electric-utility fuel market. We must face realistically the hard fact that oil and gas are making inroads into this field and will become increasingly competitive in the next decade unless coal adopts an aggressive sales program designed to protect and enlarge this market.

If utility-fuel requirements expand as has been predicted, then the coal industry should assure itself of a share of the new fuel business large enough to offset the losses in the locomotive-fuel market. The utilities should become the new backbone of the coal industry to replace the former mainstay—railroad fuel.

More long-term cost-plus contracts must be made with utilities to provide a solid foundation for marketed coal. During a seller's market similar to the one we have just witnessed, a cost-plus contract was a handicap to the operator, who was able to move his coal into more lucrative markets. Conversely, a cost-plus contract provides a comfortable cushion during adverse business periods when cut-throat competition renders coal prices unstable. Most assuredly this type of selling will provide a better return on investment than our unhealthy arrangement with the railroads, in which they dictated the price on a "take-it-or-leave-it" basis.

Coal Has a Job Ahead!

The coal industry has its job cut out for it. No longer can anything black find a ready market. Rugged competition within the industry is again the rule, requiring more vigorous sales efforts.

Now, we face not only a stiff competitive fight with fellow coal producers, we must also contend with the onslaught of oil and natural gas. Markets long considered to be within coal's sole dominion are being successfully invaded by these competitive fuels. Sober reflection upon our short- and long-term outlooks, however, coupled with a transfusion of sound, progressive sales and research plans, should go far toward restoring "King Coal" to a permanently healthy industry.

Safety With Continuous Mining

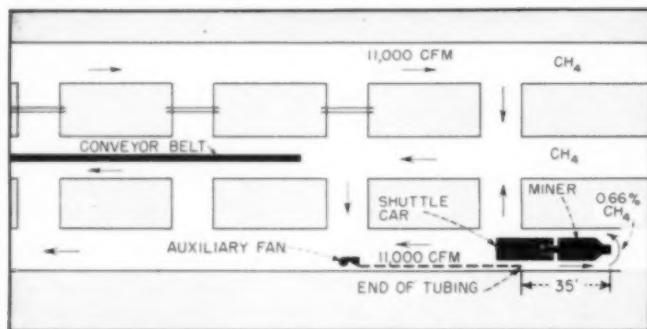


FIG. 1—AUXILIARY FAN improperly used to conduct air to the face.

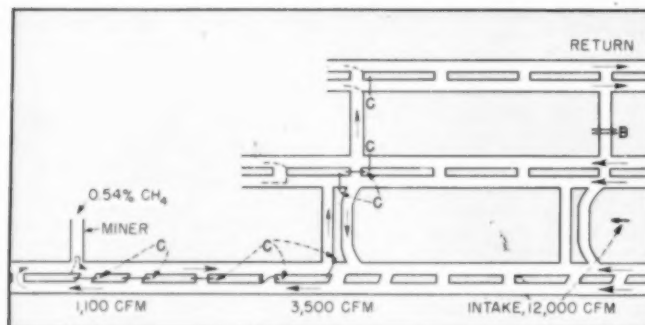


FIG. 2—INADEQUATE FACE VENTILATION resulting from excessive leakage.

Problems Not Changed Radically From the Safety Standpoint but Early Recognition of Hazardous Conditions and Prompt Corrective Action Are Essential — Eight Specific Hazards and What to Do About Them

By R. T. ARTZ, Mining Engineer

Health and Safety Division, U. S. Bureau of Mines, Pittsburgh, Pa.

FUNDAMENTALLY, the ventilation and other safety problems introduced by the new continuous-mining machines do not differ from those posed by other types of equipment used in face regions. However, to avert accidents and disasters, hazards must be recognized and corrected more promptly be-

cause of the increased rate of face advance. A bad accident record may result in legislative action restricting use of continuous-mining equipment or presenting other hardships.

The important problem, in so far as ventilation is concerned, is to sweep the entire face continuously with a current of air adequate in volume to dilute the methane that may be encountered. This implies, of course, that an adequate volume is available in the last open crosscut and that the air is conducted effec-

tively from the last crosscut to the face.

Line curtain or an auxiliary fan with tubing are devices available for conducting the air. Although these have been used for years and their correct application is well known, they still are misused in some instances, as indicated by the observed practices shown in Figs. 1 and 2. Such practices may be the direct or contributing cause of an explosion and the prelude to antagonistic legislation.

Fig. 1 illustrates three-heading development with the faces advanced by continuous-mining equipment. Coal is transported by shuttle cars and a belt conveyor. The center and left entry have been advanced 60 ft beyond the last open crosscut. Flame-safety-lamp tests indicated methane at the faces of these unventilated "dead-ends," and laboratory analyses of air samples confirmed the presence of about 0.9% methane.

The advancing face was ventilated by recirculated methanous air from an improperly located permissible auxiliary fan unit. This hazardous practice could be eliminated by placing the auxiliary fan in the left entry outby the open crosscut and conducting air to the face of each place. An ample volume (11,000 cfm) was available, but the officials in charge failed to properly conduct the air to the faces.

Fig. 2 is another example of inadequate face ventilation resulting from too many brattice-cloth stoppings and the air leakage incident thereto. Although an ample volume of air (12,000 cfm) was available at the intake to the area, only 1,000 cfm was ventilating the faces. The line curtain was about 20 ft from the face, and the air issuing from the curtain did not reach the face.

The loss in volume was a result of leakage through seven brattice-cloth stoppings and one check curtain. A more substantial stopping should be used and equipment movement arranged to eliminate check curtains. A sample of air collected at the face contained 0.54% methane. However, such a concentration may not have been present if the face had been ventilated adequately. Here again, the devices for coursing the air to the face were not used properly.

Effective face ventilation requires that an adequate volume of

Abstract of a paper entitled "Ventilation and Other Safety Problems in Connection With Continuous-Mining Equipment," presented before the Coal-Mining Section, 37th National Safety Congress,

air sweep the face continuously. To do this, many persons think a line curtain must be maintained to within 10 ft of the face, but that is not necessarily so. Furthermore, the shape and size of continuous-mining equipment prevent the keeping of a line curtain that close. In low coal the Joy miner itself acts as a curtain. In high coal, the action is less pronounced but yet somewhat effective.

Experience shows that good face ventilation is possible with a line curtain as much as 20 ft from the face, provided the velocity of the air leaving the curtain is 200 fpm or more. At such a distance the curtain does not interfere with equipment operation or movement, or with the operator. The area behind the curtain must be adjusted to suit the volume of air flowing.

The use of an auxiliary fan in lieu of line curtain in advancing places with the Joy miner is not justifiable, but is necessary with the present design of the Jeffrey Colmol and McKinlay entry driver. The size and shape of the latter prevent installing line curtain in a suitable position for adequate face ventilation. However, impending changes in design of these machines may rectify this situation in the near future.

Other safety problems involved in the operation of continuous-mining equipment do not differ essentially from those encountered with other types of face equipment. The problems may vary slightly according to the type of equipment used but basically they are: (1) roof support and testing, (2) gas testing, (3) allaying dust, (4) maintaining visibility, (5) preventing arcs and sparks, (6) rock dusting, (7) mechanical safeguards and (8) preventing spillage.

1. It is claimed that roof conditions are improved with continuous-mining equipment because blasting is eliminated. No doubt there has been some improvement, but certainly the equipment cannot make "bad" roof "good." Furthermore, most of the units have been used to date under roof conditions that might be termed good. Therefore, complete justification for the claim should await more experience.

Even though roof conditions are improved, the normal precautions should not be neglected. The basic rule still should be: determine roof condition as soon as possible and immediately install the proper type and required number of supports. The roof should be tested at fre-

quent, regular intervals, and the type and number of supports must be determined by a thorough analysis of local conditions and roof action.

2. Testing for gas is important even in so-called nongassy mines. Methane may be emitted at any time and, in the absence of adequate ventilation, result in an explosive atmosphere in a short time. Tests for gas at the face cannot be made during operation of continuous-mining equipment. Consequently, it must be stopped periodically. It is advisable to supplement this procedure by hanging a flame safety lamp where the operator can glance at it frequently. Or a continuous methane alarm might be used. A commercially available alarm can be used satisfactorily if modified slightly. In gassy mines, testing procedures (manual or automatic) should be established and rigidly enforced.

3. The problem of allaying dust before it becomes air-borne has not been solved as yet. Considerable experimentation is under way with various types and combinations of sprays, wetting agents and water pressures. The near future should bring a satisfactory solution.

4. Visibility at the face is essential. The operator must be able to see the face at all times to properly control his machine. By directing the air to make the intake pass over the operator before reaching the face, it may be kept reasonably free of excess dust.

5. Preventing arcs and sparks may or may not be difficult, depending on the source. Arcing is common when two pieces of mobile electric equipment touch, and the intensity may be sufficient to ignite an explosive mixture.

It is fundamental that a difference in potential must exist for current to flow from one piece of equipment to another, thereby forming an arc. Therefore, it is essential to have all pieces of equipment at the same potential, preferably earth. One solution is to have a continuous electrical path between the various mobile units comprising the continuous-mining-equipment set-up. This may be unwieldy in most instances and impractical in some. Consequently, the real solution is to prevent the fault currents that cause the difference in potential. This can be done by using adequately sized electric conductors properly installed and maintained in good condition.

Available devices indicate fault

currents of as little as 2 amp by deenergizing the power circuit. They are furnished with some continuous-mining equipment, but some machine operators disconnect them when power interruptions occur too frequently because of fault currents. On the other hand, the frequency of fault currents may result from the use of inferior quality materials furnished by the manufacturer. Either or both should not be tolerated.

Sparks also are produced in cutting hard binders and sulphur balls, and have been known to ignite methane. Such sparks are quite common with the cutting type of machine but are virtually nonexistent with boring units because their tools rotate at a relatively low speed.

6. Maintaining rock dust to within the proper distance of the face is not a formidable safety problem because suitable distributors are available. Where serrated ribs result from cutting, rock dust required per linear foot of equal-sized opening is about 10% more.

7. Continuous-mining equipment, as built by the manufacturer, is complete with the necessary mechanical safeguards, except for locking devices for the cutting and boring heads. Suitable devices may be built in the local mine shop.

8. Spillage, where encountered, is being cleaned up by manual labor, mobile loading machines and duck-bills, although some mines do not remove such material. Suitable devices to prevent excessive spillage are under development and should be available in the near future.

The depth of the spilled material bears no apparent relationship to coal thickness, consistently ranging from 6 to 8 in. In low coal, it is a serious problem because of the reduction in headroom.

Permitting spillage to remain on the mine floor is hazardous because a large part of this material would enter into and propagate a dust explosion. Screen analyses indicate that the minus-20-mesh material may be as much as 49%. Thus, the magnitude of the hazard is obvious, as well as the volume of rock dust required to render it inert.

In conclusion, it should be emphasized that continuous-mining equipment has not introduced any new ventilation or safety problems, but that corrective measures must be applied promptly to avert accidents or disasters and to forestall restrictive or antagonistic legislation.



Sterling Gothard (left), chief electrician; W. A. Gothard, mine superintendent; Drelus Pierce, day mine manager; George Milam, Howard Anderson and Harold Crain, face bosses; Robert Rushing, top foreman; and Guy Robinson, face boss, Lake Creek mine, Consolidated Coal Co., Johnston City, Ill.

COAL MEN ON THE JOB



Franklin Forbes (left), clerk; Charles Hardesty, civil engineer helper; and William Fulwiler, storekeeper, Green Valley mine, Snow Hill Coal Corp., Terre Haute, Ind.



J. P. Addis (left), rodman, and D. V. Ward, chief engineer, Sycamore Coal Corp. and Cinderella Coal Corp., Virginia affiliates of the Sycamore Coal Co., Cinderella, W. Va.



L. R. Kerns (left), section foreman, Frank H. Brooks Sr., mine superintendent, and C. L. Burnside, general mine foreman, Arkwright mine, Christopher Coal Co., near Morgantown, W. Va.



H. F. Stenstrom (left), special representative, R. G. LeTourneau, Inc., Peoria, Ill.; and Don Saxton, superintendent, Georgetown No. 12 mine, Hanna Coal Co., St. Clairsville, Ohio.



EXIDE-IRONCLAD BATTERIES are DIFFERENT!

Exide-Ironclad Batteries are different in CONSTRUCTION... in PERFORMANCE. The difference is due chiefly to the unique positive plate, which consists of a series of slotted tubes containing the active material. So small are these slots that, while permitting easy access of the electrolyte, they retard the active material from readily washing out or jarring loose. The result is a battery that assures peak performance with full shift availability and many extra months of service.

Exide-Ironclad Batteries have ALL FOUR of the characteristics that a storage battery must have to assure maximum performance from mine locomotives, trammers and shuttle cars—high power ability, high electrical efficiency, ruggedness and a long life with minimum maintenance. The combination of these Exide-Ironclad characteristics assures years of day-in, day-out service with dependability and economy.

**SAFE
DEPENDABLE
POWER**



"Exide-Ironclad" Reg. Trade-mark U. S. Pat. Off.

1888... Dependable Batteries for 61 Years... 1949

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • Exide Batteries of Canada, Limited, Toronto



An Open Letter to a Mine Supervisor

Dear Sir:

When a man becomes a master of some line of endeavor through personal desire and intensive training we call him a professional. He is then in a position to assemble facts, weigh them wisely and make sound decisions on the basis of those facts. Law, medicine, engineering and teaching are examples of what we consider professional fields. Note that there is one characteristic common to these and similar pursuits. That is, the people concerned have not limited themselves to so many hours each day in following their chosen careers. Each is willing to devote enough time to his work to accomplish the desired results.

In considering these marks of the professional man we arrive at the inescapable conclusion that you, the mine supervisor, are a composite of all professions.

Men who work to the top in mining have usually entered the industry through personal desire. It may be the challenge of the work, the association with other mining men, or the smell of powder smoke that attracted you in the beginning, but you continue in mining by your own choice. As soon as you decided to follow a mining career you embarked upon a program of intensive training. This training consisted—and still does—of gathering experience in actual practice and concentrated study. You demonstrate as you work and study that time involved in doing something you like is not important, and you are willing to invest any amount of it. When the time came for proving the value of

your training, you did so to the satisfaction of a group of experts, and you were certified to act as a mine official.

You are now a mine boss, and the best you can summon from your stock of experience and knowledge is needed every day to keep your organization functioning smoothly. You must have a complete working knowledge of mining laws and codes as they apply to your men and section. Getting along with your men will demand time, tact, and patience, because gripes quickly become grievances when improperly handled. In effect you are acting as a lawyer for a part of each day.

First aid, safety and accident prevention occupy a large part of your time and effort. Sincere consideration for the health and well-being of the people with whom you work and live is characteristic of the community doctor and you. Without assuming his responsibilities, you may be called upon to act until the doctor arrives.

The technical demands of modern mining are pressing and exacting. The work is complicated. New situations call for sound decisions based on a complete knowledge of mining fundamentals which has become second nature. So, for a part of each day you act in an engineering capacity.

Last, but not least, is the matter of teaching. It is one of your most important duties. Even employees of long service must be taught to some extent when a new system or machine is introduced into the operation, and the degree of success you attain with this new system or machine will

be in direct relation to the caliber of your teaching.

A new man in the mine presents you with more of an opportunity than a problem. Making a loyal friend of this "green rookie" depends on your initial contact with him. He is as bewildered as you were in his place, and he, too, made a decision this morning between getting on the cage or going back to bed.

It can be assumed that this new employee comes into your section with a receptive mind, a store of native intelligence and an eagerness to do a good job—but with practically no knowledge of the good work habits required of a successful underground team member. The development of these work habits is your responsibility, and you begin before he can pick up bad ones on his own. Again, for a part of each day you are a teacher.

These responsibilities are very real, as you well know. Merely talking about your duties is enough to work up a sweat. However, there is ample compensation. Your men appreciate sincere effort and will show it through smooth operation. Your company is willing to back your decisions and your methods of getting work done, and this is a worthwhile stamp of approval.

You and your family get a warm feeling from the knowledge that security for you and them is tied to your ability to hold a man's job in a competitive game.

As for the respect of typical Americans who understand your contributions to our mutual welfare—you have that!—Sincerely,

A Typical American

Were You in the Mood For an Accident Today?

What kind of mood were you in this morning when you got up? That's rather a simple and personal question but nevertheless a most important one that may determine for you, any morning, a change in your life—or even loss of your life.

How many times have you got up in the morning in a good frame of mind—sung while you shaved, enjoyed

your breakfast and bid the family a happy goodbye? On those days, everybody was driving safely on your way to work and no one seemed to get in your way. You greeted your crew and the other bosses with a real cheery good morning, started the day off feeling good and finished it that way. On the job, everything seemed to go along well—your men went right at it, the tough problems got licked, everybody, including yourself, were relaxed and "on-the-ball," and nobody got hurt.

But think back—how many times

has it been a different story? From the minute you climbed out of bed, things went wrong. You couldn't find your socks, you cut yourself shaving, there was a button off your shirt, you didn't like your breakfast and you left home in a huff. On the road, every other driver got in your way and by the time you got to the mine you were in no mood to give anyone the time of day. What a day that was—a long one, too, and a perfect set-up for something serious to go wrong. It could very easily be an accident, with a seri-



In actual coal field use—no blowouts with the new B.F. Goodrich all-nylon tire!

THE new B.F. Goodrich ALL-NYLON tire has proven successful in most of the country's important coal areas. Look at the record: *no blowouts, no bruise breaks, no flex breaks!* And that includes even the most severe conditions where flex and bruise failures formerly were common. Now, with all-nylon tires, operators are getting full service with no bruise or flex breaks.

Nylon is extra strong and elastic. Size for size, nylon cord is twice as strong as the cord generally used in tires. Since the new BFG nylon tires have the same number of plies as other tires, you can see that cord body strength is greatly increased. These tires have over twice the bruise resistance and many times the flex life of other cord tires.

Along with nylon, B.F. Goodrich uses weltless construction. This means there are no cross-threads to hamper cord action and allow some cords to stretch out. Therefore, tire growth is reduced; tires last longer.

Nylon tires will provide big savings for strip-mining, quarry and other operations where heavy loads and rough terrain have made tire costs high.

The new all-nylon construction is typical of the continuous improvements being made in truck tires by B.F. Goodrich. Long ago, BFG engineers developed special types of tires for coal mining service. They constantly developed new improvements. One of these was the nylon shock shield, a major construction advancement now used in all B.F. Goodrich truck tires with 8 or more plies (dou-

ble nylon shock shield in large, off-the-road tires) — including the new, all-nylon tires.

For more information on the way B.F. Goodrich nylon tires can do more work and save you money, see your BFG Dealer or write us direct. *The B.F. Goodrich Company, Akron, Ohio.*



ous injury to yourself or others, loss of time, suffering and pain resulting.

What made the difference? You're the only one that can tell what causes these two moods. It's worth thinking about!

Why not make every effort to keep your attitude right and stay in a congenial mood? You'll be happier, the world will seem brighter and, as the psychologists have definitely proved, your chances of being injured will be greatly reduced. You'll find your crew a pretty good bunch of men and your boss not half as bad as you might otherwise think. And too, your crew, reflecting your attitude, will respond to your friendliness and stand a less chance of suffering an injury.

There are many things, such as bad health, family or financial troubles, that can put you in an unpleasant frame of mind and make you accident-prone as well as unhappy. Only you yourself can do anything about it, however. It's certainly worth trying to honestly analyze what is wrong. Then you can take steps to correct the situation—with a much better chance of staying around to enjoy life.

—Adapted from the *Safetygram*,
Bell & Zoller Coal & Mining Co.

Safety Hints From A Tennessee Foreman

"I agree, 100%, with all that Mr. Michael R. Janc, Hanna Coal Co., St. Clairsville, Ohio, said in his statement entitled 'A Section Foreman Looks at Safety,' published in the September issue of *Coal Age*," writes Oscar H. Jones, Crawford, Tenn. "However, I would like very much to mention some safety practices which I have in the past placed in effect and obtained good results from.

"In all mines where it becomes necessary to abandon some entries and airways due to boundary lines or other causes I have the last complete crosscuts cut squarely against the face of the entry and airway. That is, the coal face of the entry is the same as the coal face of the airway and they must be exactly even, not one ahead of the other. This last complete breakthrough is made regardless of the coal height—sometimes it must be driven through solid rock. However, it pays.

"When these entries are stopped or abandoned I have the mine track and trolley wire removed from the face two track lengths below the last crosscut, and have always seen that not less than 6,000 cfm of air was passing through this last crosscut. Should the track and wire remain in the entry, a motor may be a half-mile away and a spark may jump from a track joint and ignite a body of explosive gas (methane), or slate may fall and the same results occur.

"In gassy mines, I have had erected line brattices to each entry face whereby the air current would be car-

ried to the face of the entry and airways and keep all explosive gases cleared away. This rule insures safety when the machine is sumping and cutting the working face; also, it insures safety to the miners working in such places. This line brattice is extended from the last crosscut to the working face.

"No explosives were allowed inside the mine during work hours for the purpose of shooting coal and rock. The shotfirers would handle this explosive after the shift was over and all the men were out of the mine. I worked this mine on the split-air system, using door regulators. This prevented the men on one district breathing the air from another district.

"Here is another practice. Should we have a mine accident, fatal or non-fatal, the date and cause of the accident were filed at the mine office and kept there for reviewing every week. We could then profit by someone's mistake and such an accident might never happen again. All accidents are caused by poor working habits or poor supervision—someone is responsible for 98% of them.

"Tennessee mining laws require 6,000 cfm of air passing the last open breakthrough. Some of our miners confine the meaning of this law only to entries and airways. I am pleased to tell all miners this law covers room breakthroughs as well as those of entries, and no breakthrough shall be over 60 ft from the last air current or open breakthrough, by Tennessee law."

There's Always a Better Way

Two boys on a farm once went into business. They invented a device to kill potato bugs that was simple and inexpensive. It consisted of two sticks. You put the bug on one stick and hit him with the other stick.

Maybe that idea was just too simple—their production rate certainly couldn't have been very high. But just the same, those boys were on the right track. They took a problem that farmers are up against. They worked out what they considered to be a better way to meet the problem.

Have you ever sat down and applied that same principle? Most important improvements have come about as a result of just such thinking. What problem do we face? How are we meeting it now? Is there a better way? If you apply these same questions to the details of your job, there's a good chance that you will come up with a worthwhile improvement. A little serious concentrated thinking has often done wonders. It's worth a try!

—Adapted from the *Safetygram*,
Bell & Zoller Coal & Mining Co.

Extra Vigilance

During periods of curtailed production or after period of prolonged mine idleness, accidents and injuries are likely to increase unless extra vigilance is observed. When a mine is not shipping coal, it is customary to reduce expenses to the absolute minimum. Consequently, jobs may be neglected that ordinarily are undertaken from day to day with the mine in production.

For example, the mine roof needs attention from day to day; loose pieces must be pulled down, timbering or retimbering must be done as necessary to maintain working places, haulageways and travelways in safe condition. When operations are resumed after a period of idleness, extra vigilance must be observed with the roof—the foremost killer and crippler of mine workmen.

After a period of idleness it takes time for the men to get back into their respective "grooves"—to perform their tasks with the same dexterity as before the layoff. The men frequently are not as alert to the dangers of their tasks and surroundings. Supervision and instruction must be extraordinarily painstaking, or accidents and injuries may be abnormally high.

After a layoff the men are "out of the habit" of doing their customary tasks; they may be thinking of fishing, hunting, gardening, baseball, or just not thinking. Consequently, getting them back into the groove and into the channels of safe, right thinking is a task of utmost importance to the supervisory staff of each mine that resumes operation after an extended layoff. Extra care—extra vigilance—must be observed to prevent the occurrence of accidents and injuries.

—*Coal Mining Safety*

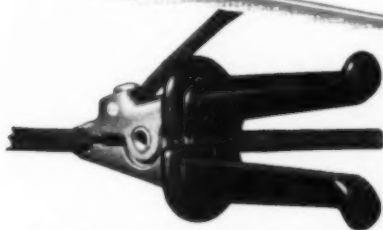
Your Crew Expects You To Be the "Boss"

Trying to be a "good fellow" with the men has caused headaches for more than one boss. Sometimes the good-fellow attitude results in passing down an order from superiors in an apologetic manner. Have you ever heard this from a boss? "I don't think this is a good idea myself, but it's orders from the office." That is a half-hearted communication and will receive that degree of cooperation from the men. They don't really want you to be a good fellow in this respect.

They expect to find dignity and consistency in your methods, among other attributes. There is a lot of respect, from above and below, for the boss who will accept unpopular but necessary orders and convert them into results without hiding behind the office. As far as the men are concerned, you are the "company."

MAKE QUICK, POWER-TIGHT CONNECTIONS WITH *O-B Ground Clamps*

- ① Tight mechanical connections to rail, rail bond or negative feeder prevent power leakage.
- ② Full current-carrying capacity helps keep your electrical system in balance.
- ③ Strong clamping grip "stays put" despite cable twisting.
- ④ Clamps for all types of grounding—rail, rail bond and negative feeder—are easy and quick to connect.
- ⑤ Fully insulated handles protect against shock.



O-B JUNIOR PLIER-TYPE GROUND CLAMP

Similar to the larger size plier-type in design, the Junior will take machine wires No. 4 and smaller. Catalog No. 19907.



O-B PLIER-TYPE GROUND CLAMP

Spring-actuated bronze jaws tightly grip rail base, rail bond or negative feeder. Adjustable cable clamp will handle cable sizes as large as 4" O. Catalog No. 19383.



O-B BULLDOG RAIL CLAMP

Using the same principle as Bulldog Clamps, this ground clamp can be attached quickly to the rail base by a twist of the rubber handle. Can handle machine cables up to No. 2. Catalog No. 16658.



O-B MINE RAIL CLAMPS

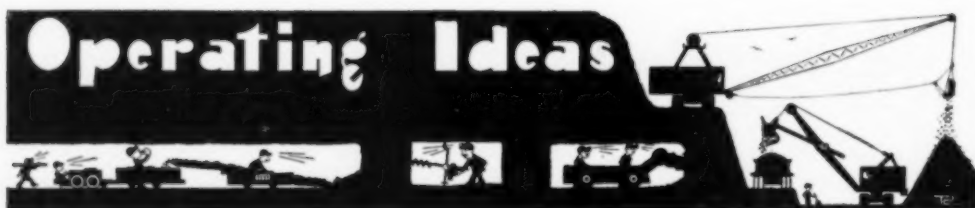
This clamp fits under the rail with the jaws gripping the rail base on both sides. The handle screws tight on the threaded jaw. This clamp will take cables sizes No. 2 and smaller. Catalog No. 14627.



Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd., Niagara Falls, Ont.



STEEL TRESTLE with part of the pipe-arch flume in place.



FLUME SECTIONS were assembled on bank and lifted into place.

Flume and Trestle Solve Diversion Problem

THE ANSWER to a water-diversion problem at the Shasta strip mine of the Shasta Coal Corp., Bicknell, Ind., was found in a steel trestle and pipe-arch flume. In planning for the stripping of a new tract of land, it was necessary to divert a creek. Conventional diversion would have required a considerable outlay for a new channel. Consequently, it was decided to

flume the water across an old cut on a steel trestle, as shown in the accompanying illustrations.

The job was started in February and completed about the middle of April, using Armco pipe-arch flume on a trestle made of steel I-beams and other steel shapes, with pipe for legs. In constructing the flume out of corrugated sections, the joints were

sealed and protected by tar and bur-lap. Height of the trestle is approximately 42 ft; length, about 300 ft; and total length of the flume, including approaches of around 160 ft on one end and 80 ft on the other, approximately 440 ft. The flume was installed in 32-ft lengths assembled on the bank. The assembly job required about 90 man-hours.



SAFE AND QUICK BLOCKING is provided by steel car stops utilizing a tongue-and-slot locking feature.

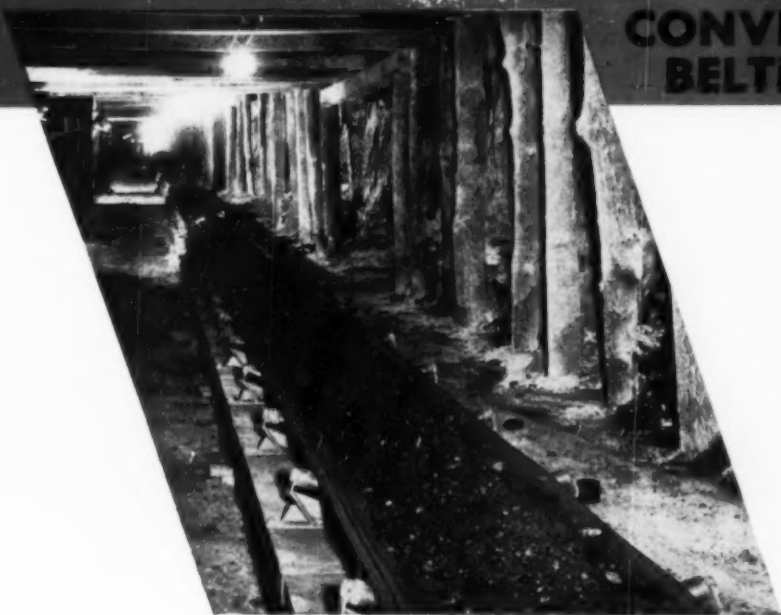
Steel Car Stops Promote Haulage Safety

POSITIVE ACTION and ease of handling are features of new steel car stops developed by Herbert Cooper, carpenter foreman at the Olyphant (Pa.) colliery of The Hudson Coal Co. Constructed of steel plate, cut and welded as shown, the blocks are used at points where trips are left standing as a regular practice. Hand-holes, cut into the side plates of the stops, permit easy handling by brakemen and car runners.

Slots are cut across the rails at the desired blocking point. These slots receive tongues welded into the car stop. A car stop is placed by merely setting it over the rail so that the tongue on the stop drops into the rail slot. The weight of a trip of cars against the stops insures a positive lock. Since haulage employees have no wheel sprags to place or remove they are less likely to be injured.

**FOR FAST, EFFICIENT TRANSPORTATION—SPECIFY
HAMILTON KING KOAL**

**CONVEYOR
BELTING**



- KING KOAL belts have the ability to meet the varying requirements of entry, gathering, mainline, slope and preparation of plant installations.
- You don't need to worry about mildew or damp rot.
- You can produce to capacity without fear of belt breakage due to severe impacts and heavy loads.
- In short, KING KOAL belts can, and will, give you uninterrupted, maintenance free performance when the going is tough and loss of time is costly.
- Our claims are based on years of proven performance.
- Why not call in a Hamilton sales engineer to discuss your belt problems and requirements.
- Thorough service and prompt delivery are assured.

WE WILL GLADLY SUBMIT
A SAMPLE UPON REQUEST



HAMILTON

RUBBER MANUFACTURING CORP.

TRENTON 3, NEW JERSEY

NEW YORK — CHICAGO — HOUSTON — LOS ANGELES
SAN FRANCISCO — CLEVELAND — CINCINNATI — PITTSBURGH

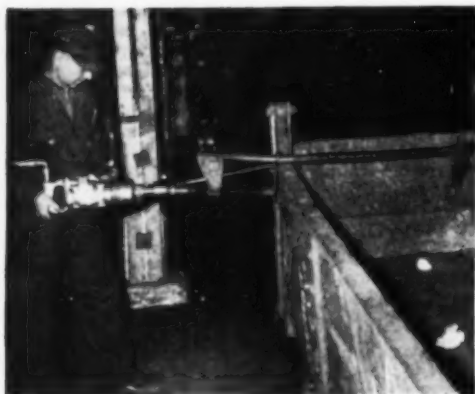


FIG. 1—STRAIGHTENING MINE CARS is speeded by impact wrench operating through jackscrew and shop-made yoke.



FIG. 2—RAILBENDER FOR HEAVY WORK mechanized by impact wrench. Special adapter permits use of air power.

Compressed Air Tools Facilitate Car Repairs



FIG. 3—ALIGNING CORNERS facilitated by special yoke. Bolts apply pressure.



FIG. 4—BRACING CYLINDER AND JACK ASSEMBLY adapt impact wrench to pulling bumper bolts.



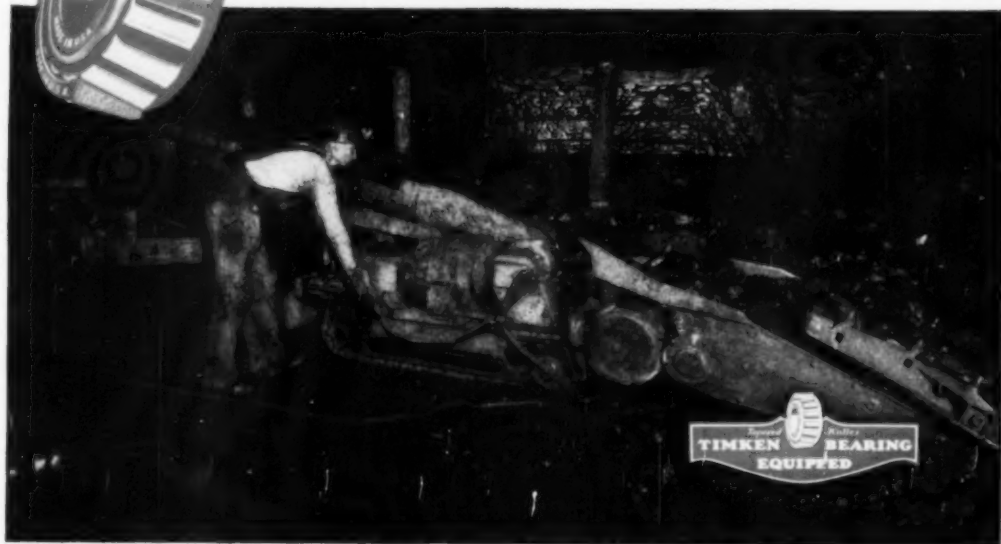
FIG. 5—SLOT IN NOSE OF JACK engages bolt head for extraction by assembly shown.

TO SAVE TIME and labor in mine-car repairs, Elmer Whitbeck, foreman of the Olyphant (Pa.) car shop of The Hudson Coal Co., has adapted the compressed-air-operated impact wrench to pressure and pulling operations.

As reported in *The Safety Commentator*, Hudson Coal's employee publication, this pneumatic tool provides twisting power in a compact, light-weight unit. To adapt it to straightening car frames, a yoke was made from a length of steel pipe with ears welded to the ends. The yoke is long enough to span the width of a car and to provide room for attaching and operating a jackscrew through the medium of a threaded sleeve welded to an ear at one end. Turning the jackscrew with the impact wrench exerts pressure on the sides of the car to straighten the iron (Fig. 1). To



Timken® bearings help keep a coal loader loading



The Joy Manufacturing Company, Pittsburgh, Pa. makes extensive use of Timken tapered roller bearings in coal loaders and other mining equipment—including the revolutionary continuous mining machine introduced earlier this year.

38 Timken bearings are used in the Joy 14-BU loaders, one of which is shown in operation. They are applied in the gathering head, gathering head gear case, transmission and track drive.

Because of their tapered construction, Timken bearings carry radial, thrust and combined loads. The line contact of rolls and races enable them to carry heavier loads and hold moving parts in alignment. The almost incredible smoothness of contact surfaces practically eliminates friction and wear.

And being made of Timken fine alloy steel, Timken bearings possess great endurance—normally last the life of any machine in which they are used. To make sure of getting Timken bearings in the equipment you build or buy, look for the trade-mark "TIMKEN" on every bearing.

THE TIMKEN ROLLER BEARING COMPANY, CANTON 6, OHIO

CABLE ADDRESS "TIMROSCO"

TIMKEN
TRADE MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS



*Smoothing the Path of
Progress for 50 Years*

NOT JUST A BALL  NOT JUST A ROLLER  THE TIMKEN TAPERED ROLLER  BEARING TAKES RADIAL  AND THRUST  LOADS OR ANY COMBINATION 



FIG. 6—HAND WORK AND TIME are saved by using air hoist to pull tie rods. Chain hitch connects to hoist rope.



FIG. 7—NAIL DRIVING speeded by air hammers. Electric drill starts the nail holes.

permit use of the wrench, an adapter is installed between the chuck of the wrench and the shank of the jackscrew. An ear welded to the pipe at its center permits the yoke to be used on shorter spans.

For heavier work, the screw of a railbender or "jim crow" is turned by the impact wrench through an adapter of proper size as shown in Fig. 2.

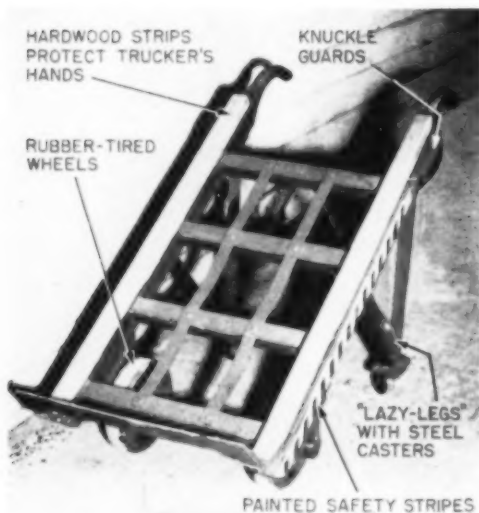
Fig. 3 shows another yoke, fabricated in the car shop, for aligning the corners of mine cars. The yoke is held in place by the pressure exerted by the jackscrew foot-plate on top of the car and the hooked shoe at the other end of the yoke. The impact wrench turns the jackscrew down to

lock the yoke in place. Bolts, with light angle sections attached to the ends, are turned through the yoke to force the corners into proper alignment.

Another job easily handled by the impact wrench, formerly requiring much time and labor, is pulling the flat-headed bolts that hold car bumpers to the drawheads. A jack-supporting cylinder was designed with a saddle on one end to straddle the bumper and slots in the other end to hold the wings of the jack and prevent it from turning (Fig. 4). The nose of the jack is slotted, as shown in Fig. 5, to receive the head of the bolt to be pulled. The bolt is driven

out far enough to provide a grip for the slot in the nose of the jack, and it is withdrawn from the bumper as the jackscrew is turned back through the collar by the impact wrench.

Other applications of compressed air include pulling the rods with an air hoist. Fig. 6 shows a chain hitch connecting the tie rod to the hoist rope for pulling. Also, nail driving in car construction and repair is speeded by the use of a light-weight air hammer equipped with a nail-driving head. A small electric drill for starting the nail holes permits the hammer to work at top efficiency (Fig. 7) in driving nails through this hard lumber.



Warehouse Trucks Made Safer

WAREHOUSE TRUCKS for mines, mills and smelters can be made safer by making the following changes, declares Paul Ziemke, Oak Ridge, Tenn., in a recent issue of *Engineering and Mining Journal*:

1. "Knuckle guards" can be mounted ahead of the handles to protect the trucker's hands while the unit is being pushed through narrow doorways and aisles.

2. Hardwood furring strips can be bolted on the side members to raise the elevation sufficiently to clear the trucker's fingers while long crates or boxes are being tilted rearward at the start of a trip.

3. "Lazy legs" running on small steel casters can be attached as shown to sustain the weight of the load at rest if desired, and to eliminate the back-breaking effort of picking up a load from the floor.

4. Side members can be painted with black and yellow stripes to improve visibility when the truck is parked in an aisle.

5. Old steel-tired wheels can be replaced with rubber-tired units to save wear on the floor and the trucker.

Specify Thermoid Steam Hose

Powerflex Wire Braid Steam Hose

Unequalled for strength and flexibility, it offers more capacity, greater safety, longer wear. The tough, thick, heat-resisting inner tube is of specially compounded black rubber . . . high-tensile steel wire braids safeguard against bursting . . . asbestos braid dissipates heat and firmly bonds the cover to the hose body. Special cover is heat and abrasion resistant. Furnished in sizes from $\frac{1}{2}$ " to $2\frac{1}{2}$ ", in lengths up to 50 feet. An all-purpose steam hose for all pressures up to 200 psi.



Hi-Temp Steam Hose

Mandrel-built—special heat-resisting rubber tube . . . braided asbestos-yarn reinforcement . . . heat and wear resistant cover. Furnished in sizes from $\frac{1}{2}$ " to 2" inside diameter in 25 or 50 foot lengths. A lighter weight all-purpose steam hose for superheated steam up to 200 psi.



#300 Steam Hose

Heat-resisting rubber tube. Cotton fabric reinforcement. Heat and wear resistant cover. Furnished in sizes $\frac{1}{2}$ " to $2\frac{1}{2}$ ", in 25 and 50 foot lengths. For general service where steam pressure does not exceed 150 psi.



These latest developments in steam hose are typical of the results obtained through Thermoid's continuing research and study of product applications. Thermoid's planned program of product research and development assures you of maximum service and lowest operating costs whenever you

specify Thermoid Industrial Rubber Products.

It will pay you to **Specify Thermoid!**

Thermoid Quality Products: Transmission Belting • F.H.P. and Multiple V-Belts • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Molded Products • Industrial Brake Linings and Friction Materials.

**Thermoid
Company**

Main Offices and Factory • Trenton, N. J., U. S. A.
Western Offices and Factory • Nephi, Utah, U. S. A.
Industrial Rubber Products • Friction Materials • Oil Field Products

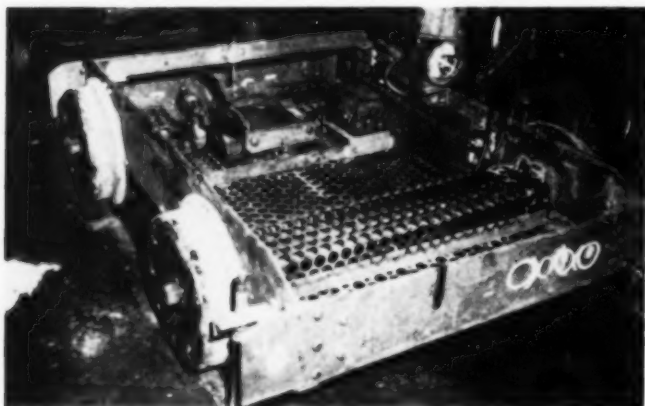
Extra Brackets On Supply Truck Prevent Stake Loss



THE PROBLEM of lost or mislaid supply truck stakes was solved by Herbert Cooper, carpenter, foreman at Olyphant colliery, The Hudson Coal Co., Olyphant, Pa., by providing extra stake brackets on each side of the truck, as shown in the illustration. The four stakes are installed in brackets on one side of the truck during loading and unloading, and this insures that they will be available when the truck is ready to be moved.

An additional benefit is derived from this practice. The stakes are kept from under the feet of the shopmen, thus preventing falls and possible injuries.

LOSS OF TRUCK STAKES is prevented by extra brackets mounted on each side of the truck.



NO LABOR REQUIRED to keep the bottom of this jeep clean.

Screen Plates Keep Jeep Bottom Clean

AN IMPROVEMENT incorporated in the second underground jeep built at Buccaneer Mine of the Sycamore Coal Corp., Patterson, Va., consists of floor plates made from screens, thus insuring against accumulation of dirt on the bottom and in the corners of the deck.

On each of the two jeeps built in the mine shop, Lawrence Hunt, chief electrician, utilized for the drive a Jeffrey Type R5E cable-reel motor, retaining the original pinion on the motor shaft and adapting the intermediate gear to the jeep axle. For journal springs he used safety-clutch springs from Chicago-Pneumatic No. 572 electric coal drills.

"Information Please," They Say

THOUSANDS OF MINING MEN study this section of **COAL AGE** regularly every month for helpful, practical information and ideas they can use on the job, so why not let us tell them about that bright idea, "kink" or "gadget" you put to work so successfully. It can be either an operating, maintenance, safety or operating idea—underground or surface—just as long as it helps mine or prepare coal better, safer, faster or cheaper. Not only will you get the "credit" from fellow mining men, but **COAL AGE** will gladly pay you \$5 or more for each acceptable idea, on publication. Jot it down in your own words and send photos and drawings if desirable. We'll polish up your description and rework your drawings if necessary. Address: The Editor, **COAL AGE**, 330 W. 42 St., New York 18, N. Y.

Cold-Weather Fuel-Pump Protection

"JUST READ your 'Tune-up Tips for Tractors' (July **Coal Age**)," writes Ned D. Boles, Bowie, Colo. "Here is a good tip for cold-weather operation of trucks—20 deg and lower—where such trucks are not stored under cover. Fuel pumps for gasoline trucks and automobiles will freeze up in very cold weather—that is, the check valves. To prevent this, an A. C. filter placed next to the fuel pump and between it and the carburetor in the gasoline line will guarantee a positive fuel supply if the fuel pump is in good condition and clean."

A NEW ALL STAR CAST



**THE NEW
TD-24**

The new TD-24 offers you more horsepower than any other crawler tractor available today—180 hp. at the flywheel, 140 hp. at the drawbar—plus dozens of features found only in the new TD-24.



The new TD-14A has 60 drawbar horsepower and many mechanical improvements. Here is additional power to produce big payloads and cut your operating costs.



**THE NEW
TD-18A**

Famous for its power and dependability, the new TD-18A now gives you 87 drawbar horsepower. All the famous International diesel engine features plus the durable construction of this new International TD-18A make this tractor an even greater payload producer than ever before.

Your International Industrial Power Distributor is now ready to furnish you these three great new stars of mining power and payload production—the new TD-24, the new TD-18A and the new TD-14A.

The great new TD-24 is America's most powerful and versatile crawler tractor with unmatched features for easier operation and far greater work capacity. No other crawler tractor can give you all the features found in the new International TD-24.

And the other two stars on the new International

power-packed team are the TD-18A and TD-14A. Known for years for their dependable performance, these two efficient tractors have had their power increased to do more work, to operate with even greater ease and economy than before.

See your International Industrial Power Distributor now. Find out the facts and get these new tractors to work for you. You'll have an all-star cast on your strip or open pit mining line-up.

INTERNATIONAL HARVESTER COMPANY, Chicago, Ill.

CRAWLER TRACTORS
WHEEL TRACTORS
DIESEL ENGINES
POWER UNITS



INTERNATIONAL INDUSTRIAL POWER

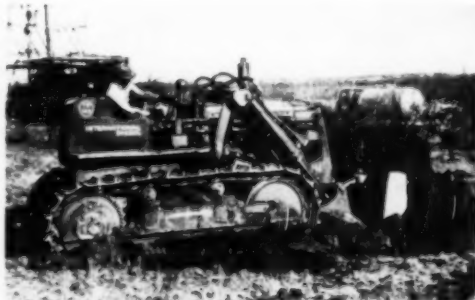


New Equipment for Better Mining and Preparation

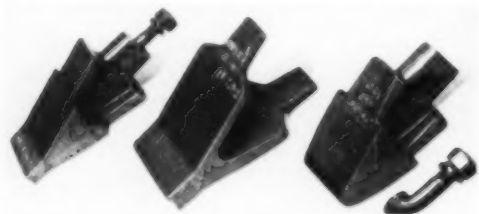
Arc Welder.....	p. 110	Glass Safety Hat.....	p. 112	Wire-Rope Cutter.....	p. 112	of personnel and activities from
Bucket Teeth.....	p. 110	Mobile Cranes.....	p. 112	EQUIPMENT SHORTS — A		the manufacturers..... p. 118
Car-Thawing Unit.....	p. 114	Pump Valves.....	p. 112	round-up of equipment and		TRADE LITERATURE — Manu-
Coal Crushers.....	p. 112	Pumps.....	p. 114	supply items for mining p. 114		facturers' bulletins available on
Diesel Tractors.....	p. 110	Sinker Drill.....	p. 114	INDUSTRIAL NOTES — News		request to them..... p. 124



DIESEL TRACTORS—Two new "A" Models of the International TD-18 (left) and TD-14 (right) diesel crawler tractors reportedly offer greater work capacities than previous models, along with numerous new features designed for increased operator comfort and longer trouble-free service life. The heavy duty TD-18A features 87 drawbar hp; 107 net engine hp at the flywheel; 101 belt hp; and a drawbar pull rated at 22,400 lb in first gear at maximum torque. For the TD-14A, horsepower is rated at 76 at the engine flywheel; 60.5 drawbar; and 72 belt;



with a maximum drawbar pull of 16,600 lb. Both units have six speeds forward up to 5.7 mph and two reserves up to 3.5 mph. Among the new features cited by the manufacturer are spring boosters on the steering-clutch hand levers for easier operation; a closed cooling system that presents loss of coolant; and more efficient lubricating oil filters which cut maintenance costs by greatly extending the usual oil-change period up to 240 hr of operation. Catalogs available.—*International Harvester Co., 180 N. Michigan Ave., Chicago 1.*



BUCKET TEETH—New-design Baker tooth point for shovels and draglines made of manganese cast steel is said by the manufacturer to have a lasting quality of two to seven times greater than other points, with a consequent reduction in replacement costs up to 85% and an accompanying saving in down time for changing of teeth. Available in two types, the solid point and weld-on tip with separate base, the point is said to work well in various materials and may be reversed from four to six times while maintaining a sharp cutting edge, which, because of the new point design, reportedly lasts for the life of the point. Bulletin available.—*Baker Point Co., 7238 Ridge Ave., Chicago 45.*



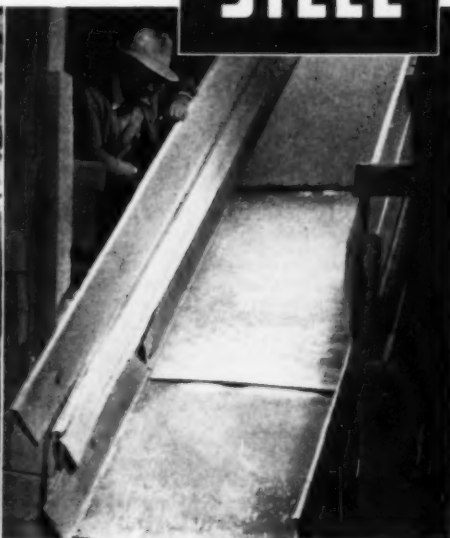
SELF-PROPELLED ARC WELDER—Weldmobile especially designed as a mobile unit to permit making welded repairs quickly and efficiently in the field eliminates the need of electrical connections for electric-drive arc welders or towing equipment for trailer-mounted welders, the manufacturer reports. Two models now available are: GR-301-M, with a 300-amp welder for light to heavy welding; and the GR-401-M, a 400-amp unit for medium to extra heavy operation. In addition to facilities for arc welding, and oxyacetylene welding and cutting, either unit can be furnished with 1- or 3-kw auxiliary dc power for supplying lights and universal power tools.—*Hobart Bros., Box 389, Troy, Ohio.*

CHUTE COSTS CUT 66% AT STUART M. PERRY COMPANY WITH J&L JALLOY HEAT-TREATED STEEL PLATES

J&L STEEL



In Perry's primary crusher J&L heat-treated JALLOY plates lasted ten times longer than mild steel under a daily pounding by 700 to 800 tons of blue limestone.



Shaker tailing chutes receive severe sliding abrasion. $\frac{3}{16}$ " J&L plates lasted 22 weeks in this application—7 times service life of mild steel.

Lower Maintenance . . . Longer Service Life Result in the exclusive use of J&L JALLOY on all chutes at stone crushing plant.

The Stuart M. Perry Company, quarrymen, of Winchester, Va., has turned to J&L JALLOY heat-treated steel to provide more efficient chute liners. Perry found that JALLOY plates last four to twenty times longer than mild steel.

The result—"JALLOY steel has cut my chute costs by two thirds." That's what Thurman Perry, supervisor of the Stuart M. Perry Company, had to say about the JALLOY steel he ordered from William G. Wetherall, Inc., Baltimore, Md.

But more specifically here's how J&L JALLOY reduced Perry's maintenance costs:

- Used as a grisley plate in the primary crusher—JALLOY lasted 5

months—10 times longer than mild steel—Saved 44 man hours per JALLOY installation.

- As the bottom chute in a 3 ft. Symons Cone Crusher—JALLOY was still in operation after 16½ months—four times the life of mild steel.

- As the head chute from the bucket elevator—JALLOY lasted 16 months—20 times the life of mild steel—Saved 80 man hours labor.

- As a shaker tailing chute—JALLOY lasted 5 months—7 times longer than mild steel—Saved 72 man hours labor.

J&L heat-treated JALLOY, a fine grained, manganese-moly steel, has a yield strength of 160,000 lbs. per sq. inch and a Brinell hardness of 341 to 388. It is available in the form of bars and in plates up to 72"

wide and 20' long, with thicknesses from $\frac{3}{16}$ " to 11".

Although twice the price of mild steel, JALLOY'S long life saves money in applications where impact and abrasion are severe such as: conveyors, crushers, scrapers, bulldozers, power shovel buckets, dump cars, and heavy-duty truck bodies.

Write for the booklet "JALLOY—J&L Alloy Steel." It contains information on properties, heat-treating, and the workability of this modern steel. The coupon is for your convenience.

Jones & Laughlin Steel Corporation
411 Jones & Laughlin Building
Pittsburgh 19, Pa.

Please send me your data booklet:
"JALLOY—J&L Alloy Steel."

NAME

COMPANY

ADDRESS

Do you recommend J&L JALLOY Steel
for

JONES & LAUGHLIN STEEL CORPORATION

From its own raw materials, J&L manufactures a full line of carbon steel products, as well as certain products in stainless steel and JALLOY (hi-tensile steels).

PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS

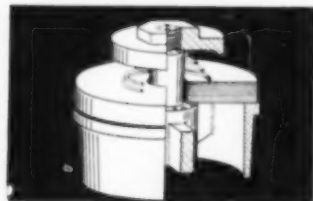
EQUIPMENT NEWS



RUBBER-TIRE-MOUNTED CRANES—Extension of the Bay City line to include a 25-ton crane powered by a heavy duty 517-cu in industrial-type gasoline engine and available in two types of mounting is said to offer bigger capacities, longer reach and higher lifts with accompanying speed and flexibility. Model 190-T61 CraneMobile (left) is mounted on a specially designed three-axle crane carrier powered by a separate heavy-duty automotive-type gasoline engine with 12 forward speeds up to 35 mph. The 190 CW CraneWagon is a self-propelled one-engine crane mounted on a six-wheel carrier with four speeds in either direction.—*Bay City Shovels, Inc., Bay City, Mich.*



GLASS SAFETY HAT—Newly developed resin-impregnated Fiberglas crown for the Bullard "Hard Boiled" hat is said by the manufacturer to be the strongest, most resilient crown available, impervious to moisture and acids, non-shattering and non-deteriorating. Featuring comparative coolness as well, the hat is available in quantity orders in practically any color desired, including a pigmented hat that glows in the dark. The adjustable-size sweatband and 6-sec hammock sweatband change assembly are additional features.—*E. D. Bullard Co., 275 Eighth St., San Francisco 3.*



RECIPROCATING-PUMP VALVES
—New industrial-type valves and

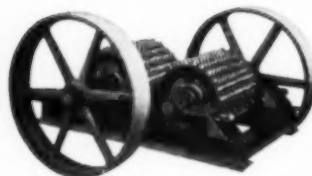
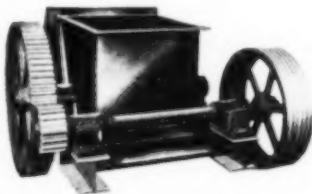
seats especially designed for reciprocating pumps handling non-abrasive fluids are available in bronze alloy with a special phenolic valve plate for operating temperatures up to 300 deg F and pressures up to 750 psi and in a corrosion- and heat-resistant nickel-copper-chromium cast iron for temperatures up to 950 deg F. Features include increased resistance to collapse of the three-web seat; reversible valve plate, low spring resistance and a recessed valve and spring retainer.—*American Iron & Machine Works Co., 517 N. Indiana, Okla. City, Okla.*



RUBBER PINCH VALVE—Designed for handling corrosive liquids, semi-solids and dry granular materials, the Wilcox rubber pinch valve is said to be non-corrosive and non-clogging, closing easily and positively, unaffected by freezing weather. All operating parts are outside the rubber tube and contained in a sealed cast-aluminum-alloy housing and the rubber tube can be rotated to distribute wear.—*Ray Wilcox Co., 1436 Land Title Bldg., Philadelphia 10.*



WIRE-ROPE CUTTER—New "Guillotine," a portable hydraulic hand tool equipped with shear-type cutting blade, reportedly can cut both wire rope up to 1 1/4 in and mild-steel rod up to 3/4 in, and also can be obtained with special center-cut blades for rod only that will cut 3/4-in reinforcing and 1-in mild steel. Built with special forgings and high-tensile-steel castings, the unit weighs only 40 lb and can be adapted to perform crimping, swedging and bending operations on large-diameter materials. Operated by hand pumping, the Guillotine features latest-type oil seals to prevent leakage, positive blade retraction and a safety-relief valve to prevent overloading. Bulletin G-10 available.—*Manco Mfg. Co., Bradley, Ill.*

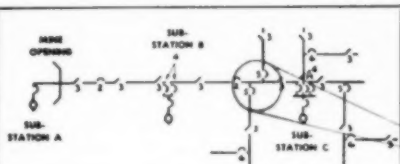


COAL CRUSHERS—New series of single roll crushers with capacities up to 90 tph (top) and double-roll double-drive units with capacities of 60 to 500 tph (bottom) have roll material of chrome-hardened semi-steel and offer various tooth patterns to meet individual crushing problems. The welded sheet-steel hopper equipped with baffle plates is bolted to the frame and is easily removed for

Production levels go up

when these sectionalizing practices are followed

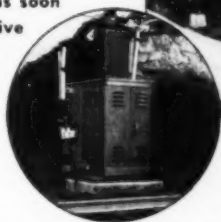
Electrical disturbances can't spread—can't interfere with production in unaffected sections—when distribution systems are properly sectionalized with I-T-E Sectionalizing Switchgear. Work stoppages and time lost are kept to a minimum—production in all but the immediately affected area continues on schedule. And even the faulting section is restored automatically—as soon as the fault has been cleared—when your protective devices are I-T-E Type KSC Automatic Reclosing Circuit Breakers!



THE RECOMMENDED D-C SECTIONALIZING PRACTICES:

Key

- 1 In each of the following cases, sufficient feeder and return circuit capacity should be provided so that the overcurrent protective device will be opened by a dead short-circuit at the most remote point of the circuit.
- 2 An overcurrent protective device should be installed between each two substations at such a point in the circuit that the resistance between each station and the device is approximately the same.
- 3 A disconnect switch or protective device should be placed at not more than 1,500 ft. intervals in every power line.
- 4 An overcurrent protective device should be used in each circuit leaving a substation. If automatic reclosing circuit breakers are employed for this, trip free operating mechanism should be used.
- 5 An overcurrent protective device should be placed at each main-branch circuit.
- 6 Each mining setup should be protected by an overcurrent protective device. In some cases, it may be necessary to protect two setups by one device.



(5) An overcurrent protective device should be placed at each main-branch circuit.

Placing an I-T-E Type KSC Automatic Reclosing Circuit Breaker on each main-branch circuit effectively and dependably prevents trouble on one branch from spreading to others.

In event of overload, short circuit, or excessively low voltage, the KSC opens instantly, remains open a definite, predetermined time (1—45 sec.), and recloses automatically upon a return to normal line conditions. Faults are confined to the branch on which they occur, production in other sections goes on with complete safety! For further information on the I-T-E Type KSC—the only circuit breaker developed specifically for the mining industry—write for Bulletin 4611.

To find out how your mine can benefit from proper applications of I-T-E Sectionalizing Switchgear, consult the I-T-E Mining Specialist in your locality. He is thoroughly familiar with the Bureau of Mines' new recommended Standard Safety Rules for installing and using electrical equipment in coal mines, and he is fully qualified to advise and assist you in sectionalizing your electrical distribution system. Use his services without obligation.

Be Production-Wise . . .

Sectionalize!



SECTIONALIZING SWITCHGEAR

I-T-E CIRCUIT BREAKER CO., 19TH & HAMILTON STREETS, PHILADELPHIA 30, PA.
31 OFFICES IN THE UNITED STATES • In Canada, EASTERN POWER DEVICES, LTD., TORONTO

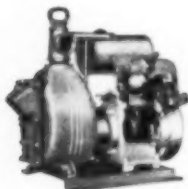
SWITCHGEAR • UNIT SUBSTATIONS • AUTOMATIC RECLOSING CIRCUIT BREAKERS

EQUIPMENT NEWS

maintenance. The double-roll units using a gearless double drive, which offer controlled resultant sizes to 8 in. are available in three sizes. Model 1920DD has a roll diameter of 18½ in. and width of 20½ in., with a capacity of 60 to 200 tph. The other two Series 28 models have roll diameters of 28 in. and widths of 24 and 36 in., with capacities of 90 to 300 tph and 120 to 500 tph, respectively. Bulletins 915 and 916 available.—*Bonded Seal & Machine Co., 2176 S. Third St., Columbus 7, Ohio.*



SINKER DRILL—New Model S48 45-lb.-class sinker of advanced design is said to offer superior drilling, rotating and hole-cleaning characteristics that make it especially suitable for use with modern tungsten-carbide rock bits. Designed for either wet or dry drilling, the S48 can be changed from wet to dry or to automatic air-operated water control merely by changing the easily removed gland and tube, without taking the drill apart or changing the back-head, the manufacturer reports. An improved steel puller has no nuts to work loose, it is said.—*Gardner-Denver Co., Quincy, Ill.*



PUMPS—New Sterling high-head self-priming pump is said by the manufacturer to be a heavy duty unit capable of pumping large capacities as well as against high heads, while offering a lightness in weight that makes it readily portable and adaptable to varied applications. The 2-in. unit (above) is rated at 10,000 gph, with the 1½- and 3-in. units available rated at 3,000 and 15,000 gph, respectively.—*Sterling Machinery Corp., 405 Southwest Blvd., Kansas City 8, Mo.*

HOPPER-CAR THAWING UNIT—New addition to the Hauck line of portable hopper-car thawing-tube equipment is a Unit equipped with a heavy duty torch flame heating burners that require no compressed air or auxiliary equipment for operation. The torch flame burners will burn either kerosene or light furnace oil and the unit has a long-stroke hand pump built into the fuel tank. After initial pumping, a few strokes every half or three-quarters of an hour will keep the burners operating, according to the manufacturer, and a wide range of heat intensity is offered. Bulletins 1063 and 1064 available.—*Hauck Mfg. Co., 124 Tenth St., Brooklyn 15, N. Y.*

ACID-RESISTANT COATING—New "Stoncote" acid-resistant plastic-formula protective coating is said to be applicable to concrete floors, walls, structural steel, machinery and other areas or parts subject to corrosion. Available in five colors, as well as in black, white, transparent and aluminum, Stoncote may be applied with either a brush or a spray, reportedly drying in ½ to 1 hour under ordinary temperature. Folder available.—*Stonhard Co., Dept. CA, 1306 Spring Garden St., Philadelphia 23, Pa.*

RIGHT-ANGLE DRIVE—New RA-2 stock right-angle drive unit features special spiral bevel gears, case-hardened and matched and lapped in pairs after hardening, with both input and output shafts 1¼ in. in diameter and mounted in precision-tapered roller bearings. The output shaft may extend to right or left, with an optional through-shaft providing extensions to both right and left. Capacities range from 6 to 12 hp depending on ratio, with stock ratios including 1:1, 2:1, 3:1, 3:2 and 4:3.—*Ohio Gear Co., Dept. 86, 1400 E. 179th St., Cleveland, Ohio.*

FRACTIONAL-HP DYNAMOMETER SET—New low-cost fractional-horsepower dynamometer set designed for industrial and educational use reportedly provides an accurate means of determining speed-torque curves, fuel or energy consumption, efficiency curves, maximum running torque, etc. The equipment has a continuous absorption or motoring rating of ¾ hp at 1,725 rpm, an intermittent absorption rating of 1½ hp and maximum permissible safe speed of 4,000 rpm, thus permitting its use with 3,600-rpm motors and with internal combustion engines and other mechanical apparatus.—*General Electric Co., Schenectady 5, N. Y.*



DRAFTER—Improved and redesigned models of Bruning drafters combining all the functions of a T-square, straightedge, triangles, protractors and scales into a single machine feature the new exclusive Bruning "Equipoise" mechanism which is said to counteract the effect of gravity by holding the drafter in any position when the draftsman is working on a tilted drawing board, preventing the drafter from drifting

Equipment Shorts



BATTERY-CELL FILLER—New and improved Exide battery-cell filler reportedly designed to permit adding water quickly, accurately and simply is operated by a finger-controlled valve and is equipped with an electric signal lamp that flashes a warning when the water in the cell reaches the correct level. Literature available.—*The Electric Storage Battery Co., 19th St. & Allegheny Ave., Philadelphia 32.*

MAP-MAKING FILM—New Kodagraph Autopositive film for reproducing maps of physical surveys and civil and mechanical engineering drawings produces a positive copy directly from a positive original drawing without a negative step, may be handled in normal room light and is exposed on conventional reproduction equipment used for making blueprints or diazos. Reportedly retaining the minute detail and fine lines often found in map-making, the film base is highly translucent, also permitting maximum printback speeds in making blueprint or whiteprint copies. Additions or corrections may be made in either ink or pencil, and erasures are accomplished with a standard two-solution eradicador.—*Eastman Kodak Co., Rochester 4, N. Y.*

Barber-Greene



DE 7401

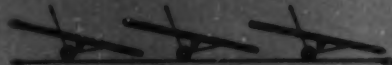
Faster..Lowest Cost per Ton.. One-Man Operation

The versatility and one-man usefulness of B-G Portable Belt Conveyors offer almost unlimited possibilities for cutting the cost per ton handled — speeding up loading, unloading, stockpiling and conveying operations wherever they're put to work. These modern high-capacity conveyors handle all materials—stone, sand, gravel, coal, coke, ashes, bulk chemicals, bagged or boxed material—even wet concrete. Available in many sizes (lengths from 25' to 60'; belt widths from 18" to 30") with advanced features that include highly portable, pneumatic-tired wheel trucks, lighter, stronger frames, V-belt drives and speed reducers—no chains or sprockets—and 100% anti-friction bearings. Use the coupon or see your B-G distributor for full information. Barber-Greene Company, Aurora, Illinois.

118



Unloading-loading cars, trucks



Multiple setups for unloading-loading, conveying bulk or packaged material.



Fast, easy towing

New Literature Describes New Advantages of
the B-G Portable Conveyors

USE THIS COUPON



Constant Flow Equipment

**BARBER-GREENE COMPANY
AURORA, ILLINOIS**

BARBER-GREENE COMPANY • AURORA, ILLINOIS

- ☐ Send new literature on B-G Portable Conveyors.
☐ Have distributor get in touch with me.

Name _____

Firm Name _____

City _____ Zone _____ State _____



TIPPLE
EQUIPMENT



SHEAVES



CAGES



SKIPS



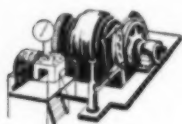
LOWERING
SPIRALS



CAR PULLER
AND RETARDERS



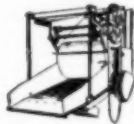
LABORATORY
CRUSHERS



HOISTS

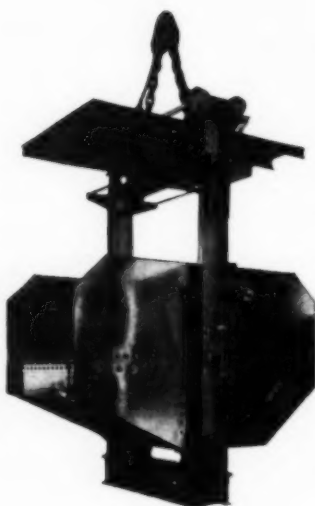


VIBRATING
SCREENS



DUSTULATORS

For
**Fast
Caging**
Fast
Hoisting
Fast
Dumping
Choose a
**HOLMES
CAGE**



Pre-tested suspension chains with fittings of ample proportions for added protection—Modern improved safety devices reduce danger of serious accidents—Simplified standard Caging and Dumping mechanisms, the results of careful designing—Rugged, well balanced construction, reserve strength built in at critical points, keeping weight at a minimum—Latest design and manufacturing standards plus highest quality material obtainable are used exclusively.

We offer a complete line of Stationary Platform—End Dumping—Side Dumping—Overturning—Man and Material Cages, manufactured from steel or aluminum.

Why not decide on Holmes Cages and benefit from our 50 years experience and leadership in building cages of all types. We'd like to receive your inquiry—our study and recommendations will be made without obligation on your part.

**ENGINEERS, MACHINISTS
STEEL FABRICATORS
PATTERN MAKERS
GREY IRON FOUNDERS**



ROBERT HOLMES & BROS., INC.
DANVILLE, ILLINOIS

down the board and eliminating any tendency to kick back.—Bulletin A-1055 available. Charles Bruning Co., Inc., 4754 Montrose Ave., Chicago 41.



GOGGLES—Style DL31 featuring deep well-perforated eye cups to permit air circulation and reduce fogging and designed for hot jobs and Style DL48 indirectly ventilated with two baffled and screened ports on each eye cup especially for dirty jobs are reportedly made of high grade pliable leather that absorbs and distributes impact shock. Both have a quickly adjustable one-piece elastic headband and impact-resistant "Super-Tough" lenses.—Willson Products, Inc., Reading, Pa.

INSULATION TESTER—New Model 184C portable insulation tester that is said to provide complete facilities for taking insulation-resistance and dielectric-absorption measurements on cables, transformers, rotating machinery, condensers, etc., with breakdown voltages accurately determinable with a minimum of damage from burning, has four voltage ranges providing continuously variable dc voltages up to 10 kv. A constant voltage transformer regulates the voltage within 1/2% and full manual control is provided for selecting any output voltage up to the maximum.—Radio Frequencies Laboratories, Inc., Ronton, N. J.

STEEL SHELVING—New movable Iron-Grip steel shelving available in open and closed shelving, parts bins and counters features a special stud for speedy and simple assembly without nuts, bolts or tools. Shelves reportedly are instantly movable on 1 1/2-in centers, dividers on 1-in centers and all parts are 100% adjustable from front of the unit. Catalog available.—Equipto, Div. of Aurora Equipment Co., Aurora, Ill.

ELECTRIC HAMMER DRILL—New Model 25-RO rotating electric hammer is designed to both hammer and rotate the drill bit at the same time, thus reducing the work of drilling concrete, masonry or rock by eliminating turning of the star drill wrench by hand. The unit drills up to 2-in holes and is available for either 110 or 220 v ac. A new line of drill steels offered for use with the new hammer has carbide cutting edges and spiral flutes that are said to operate much faster, permit drilling hardest rock and clean cuttings from the



One of the larger breaker heads is shown above. Note its sturdy construction. Performing on the business end of the unit, these large breaker heads dig and cut the coal as the machine moves forward. An installation view is shown below.

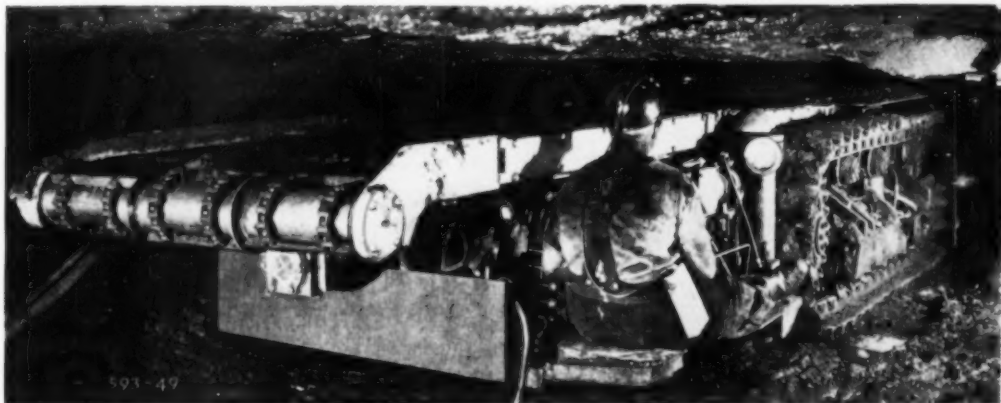
LIKE A GIANT 'MOLE'

JEFFREY COLMOL

BORES THROUGH THE SOLID
TO PRODUCE LARGE TONNAGES

BIG BREAKER HEADS DO THE TRICK

Yes Sir! This interesting new one-process device really goes in after that coal...takes it out with a speed that spells 'Mass Production.' No question about it...once you have seen the COLMOL in action—and it's action all the way—you will be amazed at its ability to produce 3 to 5 tons per minute. It cuts and loads simultaneously—takes the place of conventional cutting, drilling and loading machines—no shooting required. We will be glad to tell you more—write us.



The **COLMOL** is engineered, manufactured, sold and serviced by

THE JEFFREY MANUFACTURING COMPANY

912 NORTH FOURTH STREET, COLUMBUS 16, OHIO

Add a BIG ***SAFETY*** FACTOR to your hoist

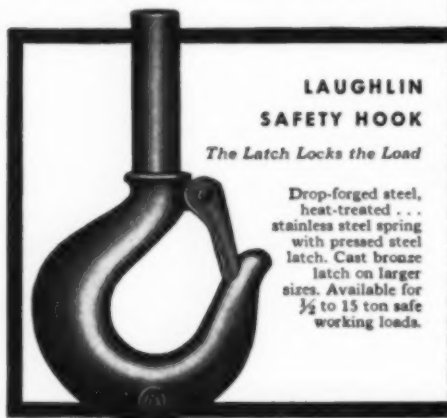
A Laughlin Safety Hook will boost the "safety efficiency" of your hoist many times . . . protecting workers against injury and equipment against damage from accidentally slipping loads.

**Make sure your next Hoist
is equipped with a
LAUGHLIN SAFETY HOOK**

Specify "Laughlin Safety Hooks" when ordering new hoists from your distributor. They pay for themselves many times over in accidents avoided.

**Play safe — change over your
present Hoist Hooks to
LAUGHLIN SAFETY HOOKS**

Order from your distributor according to the size now on your hoisting equipment . . . or state the capacity of your hoist and he will furnish the correct Laughlin Safety Hook to fit your needs.



LAUGHLIN SAFETY HOOK

The Latch Locks the Load

Drop-forged steel, heat-treated . . . stainless steel spring with pressed steel latch. Cast bronze latch on larger sizes. Available for ½ to 15 ton safe working loads.

Send for Laughlin's famous data book of fittings — ask for Catalog #145. **THE THOMAS LAUGHLIN COMPANY, DEPT. 6, PORTLAND 6, MAINE.**

There is a
**LAUGHLIN
SAFETY HOOK**
for every
**HOISTING or
MATERIALS-
HANDLING
JOB**



3310
½ to 15 tons



3320
½ to 15 tons



3316
½ and 1 ton



3315
750 pounds

hole. Catalog available.—**Syntro Co., 975 Lexington Ave., Homer City, Pa.**

RESISTORS—Bulletin 35 Edgeholm high-current resistors now are obtainable in four shorter lengths of 6, 9½, 12½ and 15½ in., as well as the 19-in. previous length, with a greater flexibility of application resulting. Minimum resistance value per units is extended from 0.35 to 0.05 ohm, with continuous current capacities ranging from 21 to 79 amp for all sizes and maximum continuous duty ratings of approximately 2,200 for 19-in. units to 320 w for the 6 in.—**Ward Leonard Electric Co., 31 South St., Mt. Vernon, N. Y.**

PLUG VALVES—Three new Durco corrosion-resisting plug valves include Type A in 1- to 3-in. sizes for almost every type of corrosive service under medium pressures and Type B top-lubricated and Type B bottom-lubricated from ½ to 6-in. They are available in various alloys and new and improved features are said to offer greater service in handling of a range of corrosive materials. Bulletins 636, 637 and 638 available.—**The Duriron Co., Inc., Dayton 1, Ohio.**

Industrial Notes

C. J. Moore, manager, Pittsburgh branch, has been named manager, Exide railway and motive-power sales division, The Electric Storage Battery Co., Philadelphia. Mr. Moore was supervisor of motive-power sales from 1942 to 1946, when he was transferred back to Pittsburgh branch as assistant manager, becoming manager shortly after. **C. H. Leet**, who joined the company in 1938 as a salesman in the Pittsburgh branch, succeeds Mr. Moore.

Elliott Co., Jeanette, Pa., last month acquired the business and assets of the Crocker-Wheeler Division of Joshua Hendy Corp. With the addition of the Crocker-Wheeler facilities, Elliott now has a complete line of ac and dc motors ranging in size from 1 up to 25,000 hp. Formerly, the Elliott line of equipment did not include motors under 200 hp. The Crocker-Wheeler Division of Elliott Co. will continue to operate under its previous management, with **Charles A. Butcher**, who also has been elected a vice president of Elliott, as general manager.

Chain Belt Co., Milwaukee, announces the election of a new vice president and several other organizational changes. **William J. Sparling**, formerly works manager, has been elected vice president and manager, chain and transmission division. **E. P. Meyer**, assistant works manager, succeeds Mr. Sparling. **Roscoe O. Byers**, formerly production manager of the

LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS



COALMASTER DRILLING TOOL NATION-WIDE DISTRIBUTION

Specialized Field Warehousing for Quick Delivery

**THE BUDA
COMPANY**
Harvey, Illinois

DOOLEY BROTHERS
Peoria, Illinois

**SALEM TOOL
COMPANY**
Salem, Ohio

**ILLINOIS
POWDER MFG. CO.**
St. Louis, Missouri
Salt Lake City, Utah

**AUSTIN
POWDER COMPANY**
Cleveland, Ohio

**DIAMOND SUPPLY
COMPANY, INC.**
Evansville, Indiana

**JOY MANUFACTURING
COMPANY**
Main Office: Pittsburgh, Pa.
Subsidiaries and representatives
in 57 countries.



- These distributors are ready to serve you quickly and dependably through their strategically located warehouses with the complete line of Coalmaster Drilling Tools.
- Conveniently located to give your drilling needs prompt attention, they offer highest quality tools ... highest quality service.

COALMASTER DRILLING TOOLS

FOOTVALVE STRAINERS?



BUY'EM
FROM
GUYAN



An improved accessory for pumping equipment—provides straining surface approximately double the area of pipe for which the unit is tapped. Has built-in check valve.

GUYAN MACHINERY CO.
LOGAN W. VA.

SAVE ON QUALITY

**AXLE BEARINGS
JOURNAL LINERS
BUSHINGS
WEARING PARTS**

for General Electric, Sullivan, Goodman, Oldroyd, Jeffrey, Westinghouse and Joy equipment. American Crucible methods, experience, know-how, and equipment spell big savings for you. Each part produced from Promet Bronze is of the specific formula best suited to the application, and is sold with a money-back guarantee of longer service and lower maintenance cost.

PROMET BAR STOCK
Round, hexagon, square,
rough cast, semi-finished.
Cored stock, all
sizes (by 1/8" steps)
from 1/2" minimum size
to 12" O.D. and 3-
inch lengths. 8 1/2
grades of hardness.



**PROMET
LEAD OR
TIN BASE
BABBITT**

Let us quote you on your requirements or write for free folders.

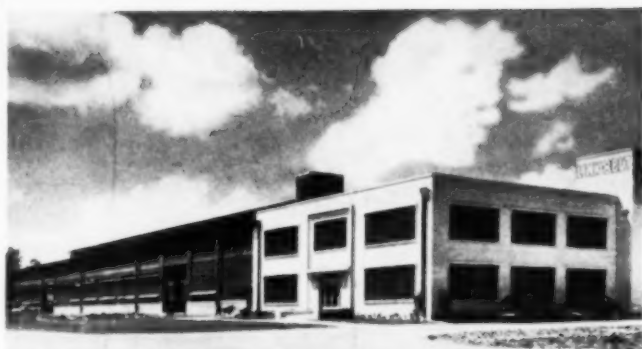
The American Crucible Products Co., 1307 Oberlin Ave., Lorain, Ohio, U. S. A.

Prompt deliveries. Stocks maintained at

BECKLEY, W. VA., The Universal Supply Company, 1207 S. Kanawha St.	Phone 7307
KERMIT, W. VA., Contoller Block & Supply Company	Phone 301
MCCLEURE, VA., The Erwin Supply & Hardware Co.	
LORAIN, OHIO, The American Crucible Products Co.	Phone 8183-1
TERRE HAUTE, IND., The Mine Supply Co., Inc.	Phone Crawford 8150

Other Representatives

ALTON, ILL., Frank E. Rhine, 423 Blair Ave.	Phone 3-8624
BIRMINGHAM 3, ALA., F. B. Kaiser, Jr., 1608 First National Bldg.	Phone 7-2383
MT. LEBANON, PA., J. E. Nieser, 720 Roselawn Ave.	Phone LE-9874
NEW YORK CITY, Trans American Commerce Co., Inc., 165 Broadway	Phone 7-4340



Link-Belt Opens New Houston Plant

THIS MODERN new manufacturing plant built in Houston, Tex., to serve the expanding industries of the company's southwestern division was formally opened Sept. 27 by officials of the Link-Belt Co., Chicago. Comprising 45,000 sq ft of floor space located on a 10-acre plot, the new facility includes a modern machine shop, structural-steel shop, large warehousing facilities and a two-story office section. It will serve Link-Belt customers, either direct or through distributors, in Texas, Oklahoma, Arkansas and Louisiana.

company's Milwaukee plants, has been appointed factory manager, chain and transmission division. Clarence B. Ringham, newly appointed factory manager, heavy machinery divisions, previously was superintendent of Chain Belt Plants 3 and 4. George B.

Flanigan, newly appointed manager of trade relations, has held executive positions on the Milwaukee staff since 1945.

Wm. E. Madden, recently elected vice president, has now been made general sales manager of the George Haiss Mfg. Co., Inc., New York, division of the Pettibone Mulliken Corp., Chicago.

E. F. Luna, formerly advertising manager, Anaconda Wire & Cable Co., has been appointed to the newly created position of sales promotion manager, in which he will supervise sales-advertising liaison, new-product promotion, market analysis, market development, sales training, publicity and customer and public relations.

Hendley Blackmon, managing editor, *Electrical World*, since 1947, has been appointed assistant manager of engineering-association activities for Westinghouse Electric Corp., with headquarters at the East Pittsburgh works. Mr. Blackmon, who will work with Westinghouse engineers in the preparation of papers to be presented before engineering associations, was associated with Westinghouse from 1925 until 1945, when he resigned to become electrical editor of *Product Engineering*. In 1946 he was made managing editor and a year later appointed managing editor of *Electrical World*.

S. J. Woodworth, associated with the company for more than 25 years, has been appointed sales manager, Wright Hoist Division, American Chain & Cable Co., Inc., with headquarters at York, Pa., succeeding A. R. Haskins, who has resigned to establish a business in Milwaukee, Wis.

F. Penn Holter, formerly assistant

First Choice

FOR AUGERING WITH AIR!

Thor PERCUSSION TYPE COAL DRILLS



No. 28

30 LB. SINKER

Ideal tool for light to medium drilling. Can be equipped with auger rotation.



No. 139

35 LB. AUGER

Auger rotation on power stroke. Famous for trouble free operation, air economy.



No. 35

35 LB. SINKER

Endless wear from operating parts. Exclusive valve design gives extra power, efficiency.



No. 39

45 LB. AUGER

Powerful rotation prevents stalling even in heavy, sticky formations.

ROTARY TYPE



Cool Auger Capacity: 2"

Available in speeds 700 to 450 R.P.M., reversible or non-reversible. Equipped with full size steel protection plate, U.S. approved chuck.

POWERFUL... ECONOMICAL... SAFE!

Designed particularly for blast hole drilling in coal mines, these Thor PERCUSSION TYPE and ROTARY TYPE pneumatic coal drills meet every requirement for sure, safe, easily controlled power drilling. Exclusive heat treating process assures amazingly long life for operating parts. Easily operated forged steel retainers on percussion type tools; rotary type equipped with chuck developed to meet safety code of United States Bureau of Mines. For complete information and demonstrations, see your Thor distributor or write Independent Pneumatic Tool Co., Aurora Ill.

Percussion type drills available with offset handle for plant-mounted operation, rotary type utilizes plate of protection plate for same purpose.

Thor

TOOLS

FOR MODERN MINES

Prices Cut!
ON



Aluminum
Alloy Mine
Roof Jacks

**4 Major
Improvements**

Increased volume
plus production
economies have en-
abled us to improve
our jacks and low-
er our price. Get
the facts.

WRITE

Star Jack Co.
ELMWOOD PARK
CHICAGO 35, ILL.

Distributors in all fields.



Chicago Pneumatic's Utica Plant Nearing Completion

NEW UTICA PLANT of the Chicago Pneumatic Tool Co., New York, nearing completion at a cost of \$5,000,000 reportedly features one of the most unusual manufacturing layouts in the country—two completely separate horseshoe production lines inside the building, which is over 1/5 mi long and nearly half as wide. The layout and special facilities provided are expected to permit maximum manufacturing efficiency.

manager, has been appointed manager of manufacturing, construction-materials department, General Electric Co., Bridgeport, Conn., succeeding E. J. Harrington, who has been assigned to the staff of the vice president-in-charge of manufacturing policy.

SKF Industries, Inc., has appointed Emerson D. Ogle, formerly manager of the automotive and electrical section, manager of its industrial sales department, succeeding C. D. Cummings, resigned.

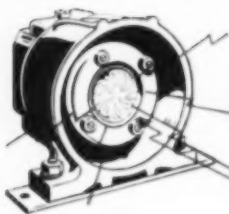
Harry K. Wilcox Jr., formerly manager, equipment sales, and associated with the company since 1936, has been named assistant sales manager, I-T-E Circuit Breaker Co., Philadelphia. Nye S. Spencer, previously with I-T-E's Chicago district sales office, has been appointed manager, equipment sales, succeeding Mr. Wilcox.

Rome Cable Corp., Rome, N. Y., has acquired the Andersen-Carlson Mfg. Co., Torrance, Calif., manufacturers of electric metallic tubing. The plant will continue under the direction of Arthur A. Andersen, president and Gilbert Woodill, secretary, and no change in personnel is contemplated. Sale of Andersen-Carlson tubing has been handled by the Rome Cable Corp. since the start of production about a year ago.

Geo. P. Reintjes Co., Kansas City, Mo., has appointed P. M. Ofill Jr. a sales representative for its Pittsburgh, Pa., district. Mr. Ofill, formerly of Pittsburgh, has represented the company in its California area.

Joseph A. Conlon has been named district sales manager, Chicago branch, mechanical goods division, U. S. Rubber Co., succeeding William T. Keenan, who has retired after 39 years of service with the company. Mr. Conlon, who joined the company in 1930, has been assistant Chicago district sales manager since 1945.

Iron & Steel Products, Inc., Chicago, has named J. J. Collins general manager. Mr. Collins was associated

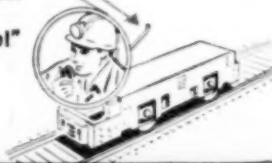


*Why Take Chances...
Trolleyphone!*

Modern coal mining means safe mining the Femco way—by Trolleyphone. This instant two-way contact with moving motormen, foremen at the face, and any other section means quick reports and quick action—in time. Dispatcher's orders double-checked! Instant notice of breakdowns or runaway cars to other motormen! All stations called at once!

"Guard Mine Safety—by Trolleyphone!"

- Alerts crews anywhere
- Gets action anytime
- Stops accidents
- for high safety rating

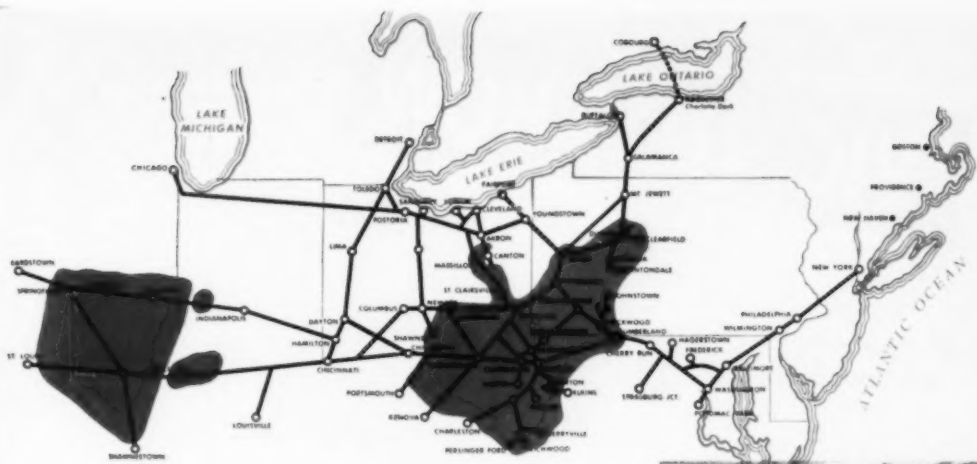


**FARMERS ENGINEERING
AND MANUFACTURING COMPANY**

349 BRANTON AVE. • PITTSBURGH 21, PA.

Specialists in Electrical Communications Equipment

**Femco
TROLLEYPHONE**
"It Speaks For Itself"



Coal is where you find it...

but economical B&O coals are within easy reach of the industries that need them



HOWLAND HOOK, Staten Island, N. Y.



COAL FACILITIES, Toledo, Ohio



COAL FACILITIES, Lorain, Ohio



CURTIS BAY, Baltimore, Md.

This map should interest you. Note where the vast Bituminous deposits on the Baltimore & Ohio lie — then observe the strategic position of B&O rails serving the heart of industrial America. This is accessibility—the plus that means economy when you buy coals on the B&O!

Through the great B&O ports of Lorain, Toledo, Fairport, and Buffalo on Lake Erie, and Charlotte on Lake Ontario, consumers in all the Great Lakes region and in Canada have access to B&O Bituminous. Terminals accessible to B&O at New York

and Philadelphia, as well as B&O's own tidewater terminals at Curtis Bay, Baltimore, and Howland Hook, Staten Island, N. Y., place this coal on the doorsteps of Atlantic Coast consumers.

Because *Bituminous is basic*, B&O has spent more than \$80,000,000 in the last three years to improve system-wide facilities for bituminous distribution. Wise consumers with an eye to efficiency, economy, wide variety, and vast reserves, "bank on B&O Bituminous." Ask our man!



BITUMINOUS COALS FOR EVERY PURPOSE

BALTIMORE & OHIO RAILROAD

Constantly doing things — better!

"VIC" TELLS HOW

**YOU GET THE MOST
FOR YOUR MONEY WITH AN
ALL-VICTAULIC SYSTEM!**

Get real economy in your piping system. Save WORK! Save MONEY! with an ALL-VICTAULIC INSTALLATION.

A Complete Victaulic System is unbeatable for all-round flexibility and simplicity. It's the best way to solve tough piping problems and keep piping costs L-O-W!

Victaulic Couplings, Victaulic Full-Flow Elbows, Tees, and other Fittings are built for hard use . . . designed for quick assembling, give leak-tight dependability. Two-bolt coupling makes hook-ups quick and easy . . . a standard T-Wrench is the only tool required! Yes, VICTAULIC gives you the best in modern piping construction . . . assures long-lasting, leak-proof joints . . . safe, dependable service under toughest pressure, vacuum, or strain.

"Vic-Groover" makes pipe end preparation easy . . . grooves ends automatically in half the time of a conventional pipe threader!

CHECK INTO THE VICTAULIC LINE
Write for:

"Victaulic Catalog and Engineering Manual No. 44.

"Vic-Groover" Catalog No. VG-47.

FOR FULL ECONOMY...MAKE YOUR PIPING SYSTEM ALL VICTAULIC!

SELF-ALIGNING PIPE COUPLINGS

VICTAULIC

EFFICIENT FULL-FLOW FITTINGS

VICTAULIC COMPANY OF AMERICA

30 ROCKEFELLER PLAZA, N. Y. 30, N. Y.
Victaulic Inc., 727 W. 7th St., Los Angeles 14, Cal.
Victaulic Co. of Can. Ltd. 200 Bay St., Toronto 1

For Export outside U. S. and Canada: PIPSCO
Couplings and Fittings - Pipe Couplings, Inc.,
30 Rockefeller Plaza, New York 20, N. Y.



Sizes - 1/4"
through 60"

with the Erie R.R. for 37 years in various executive and supervisory capacities before joining ISP.

A. Leschen & Sons Rope Co., St. Louis, Mo., has elected Arthur A. Leschen president and Douglas W. Vernon vice president and general manager. Mr. Leschen, a grandson of Adolph Leschen, who founded the company in 1857, joined the firm in 1902 and formerly was vice president in charge of production. Mr. Vernon, formerly vice president in charge of sales will continue to direct the sales department.

E. G. Schroeder has been appointed field sales manager of the Electric Products Co., Cleveland, Ohio. Mr. Schroeder, who will supervise all district sales activities, formerly was in charge of the Detroit district office.

Flexible Steel Lacing Co., Chicago, has named Fred O. Benson sales representative in Illinois, covering most of the territory formerly handled by Sam Baker, who retired last year after 31 years with the company.

Lloyd Wolf, formerly chief development engineer, has been made chief engineer in charge of the Twin Disc Clutch Co.'s engineering department at Racine, Wis.

Gar Wood Industries, Inc., has appointed W. S. Blakeslee Jr., assistant general sales manager. Mr. Blakeslee, who was formerly sales manager of the Wayne Division, has been succeeded by R. J. Nymberg.

Trade Literature

Available Without Charge on
Request to the Manufacturer

ALLOY STEELS—Bethlehem Steel Co., Publications Division, Bethlehem, Pa. New sound motion picture in black and white, entitled "Alloy Steels—A Picture of Controlled Production," depicts the various steps in present-day manufacture of alloy and special steels, emphasizing particularly the care exercised in the control of all manufacturing processes. Showing time is 43 min and the film is available in both 16 and 35 mm on request.

BEARINGS—Link-Belt Co., 307 N. Michigan Ave., Chicago 1. Catalog and Engineering Data Book 255, covering the company's complete line of ball and roller bearings, points out important construction features and provides list prices, weights, load ratings and all necessary dimensions for the various standard models available. Included also is selection and engineering information and data on welded-steel base plates, lubrication fittings, maintenance and lubrication, shafting, Link-Belt quality-controlled bearing-manufacturing facilities and various installations.

BLOWERS—Roots - Connersville Blower Corp., Connersville, Ind. Bulletin 21-B-37 covers the smaller-size Type AF rotary positive blowers designed for pressure or suction service and built in 18 standard sizes, with capacities ranging from 5 to 700 cfm

Copyright 1949, by Victaulic Co. of America

PARIS MANUFACTURING COMPANY

Announces

THREE NEW DRILLS

The PARMANCO Coal Drill will drill $2\frac{3}{4}$ inch holes at a speed of up to six feet per minute in #5 coal. Equipped with heavy duty truck-type transmission and rear end and a complete hydraulic feed, the drill is operated by one man from the control seat. It is made in two sizes with a 12 h.p. or 25 h.p. gas motor and all units are completely self-contained and enclosed in oil-tight cases.

ALREADY USED by

United Electric Coal Companies & Enos Coal Mining Co. 1
Ayrshire Collieries Corp. 2 Huntville Blastair Mining Co. 3
Big Bend Collieries, Inc. 1

**THIS UNIT IS DELIVERING 6-INCH SHOT
HOLES — READY FOR LOADING
at Better Than a Foot a Minute !!!**

The new PARMANCO Hi-Speed Horizontal Drill is completely redesigned around a 40 h.p. engine with four drilling speeds which, in field tests, has cut one-third off the footage drilling time — a cost-per-drilling-foot saving that we are passing on to the strip mine operator and contractor at no increase in our price. In addition the drill is equipped with a starter and generator, dual type front wheels, truck type rear axle with mechanical brakes and a traction drive with both forward and reverse.

PARIS
MANUFACTURING
COMPANY
Paris, Illinois

here's a Coal Mine building
if you ever saw one



As an experienced mining man you probably have pretty definite ideas on the kind of building you need on mining properties. Let's see how ARMCO STEELOX Buildings meet these requirements.

Here is a sturdy, dependable building that provides all the advantages you would normally expect in any permanent structure. But the unique construction also makes it ideal for use on temporary sites.

ARMCO STEELOX Buildings are easily and quickly moved. They retain structural strength and weather-tightness even when dismantled and re-assembled many times. Obsolescence is never a problem.

You'll also appreciate how easily and quickly STEELOX Buildings can be erected. The STEELOX Section provides both structural support and finished surface. On the roof it replaces rafters, sheathing and roofing. For sidewalls it eliminates framing and exterior covering.

There is a size and type of Standard ARMCO STEELOX Building for practically every mining need. Write for complete information. Armco Drainage & Metal Products, Inc., 2575 Curtis Street, Middletown, Ohio.

STEELOX Timetable

Actual case history shows how one coal mining company moved a Standard ARMCO STEELOX Building (12' x 32' x 8') to a new site using only 5 men and a truck.

7:00-10:30 A.M.—Dismantled building and loaded on truck.
10:30-11:00 A.M.—Driving to new site.
11:00-11:30 A.M.—Lunch.
11:30-7:00 P.M.—Building completely re-erected and ready for use.

Only a total of 55 man-hours required for complete move.



ARMCO STEELOX BUILDINGS
HEAD HOUSES • OFFICES • UTILITY BUILDINGS • SUB-STATIONS • PUMP
HOUSES • LAMP HOUSES • ENGINE ROOMS • TOOL SHEDS • AND OTHERS

up to 3 lb. 5 to 415 cfm up to 5 lb. and 15 to 245 cfm up to 7 lb. Construction features, operating characteristics, drive arrangements and a selection table are included.

ELECTRICAL EQUIPMENT—Cutler-Hammer, Inc., 220 N. 12th St., Milwaukee 1, Wis. Merchandising catalog, 1949-50 edition, illustrates and describes the company's line of safety switches, service control and multi-breakers, motor control and electrical specialties.

MOTOR BEARINGS—Westinghouse Electric Corp., Box 868, Pittsburgh 30, Pa. Bulletin B4378 discusses pre-lubricated bearings used in Westinghouse Life-Line motors, including "Desirable Qualities of Grease," "Tests to Prove the Adequacy of Grease," and "Tests to Prove the Seal's Effectiveness."

MOTOR MAINTENANCE—Ideal Industries, Inc., Sycamore, Ill. Booklet, "Commutator and Slip Ring Maintenance—a Handbook of Procedures and Methods," describes and illustrates commonly encountered commutator and slip-ring maintenance problems and their remedies, covers general maintenance procedures and includes a section offering details of various Ideal products particularly designed for such work.

DC MOTORS AND CONTROLS—Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. Bulletin 95B6902A covers latest construction features of Allis-Chalmers large dc motors and control for heavy-duty drives used especially for applications requiring wide speed variation and fine speed control, including a description of "Frog-Leg" armature windings (a combination wave and lap winding that gives good commutation without cross-connectors) and views of the new-style mill-type spherical-seated thrust bearing with welded-steel pedestal for heavy service.

DUST MASK—Mine Safety Appliances Co., Braddock, Thomas, & Meade Sts., Pittsburgh 8, Pa. Bulletin CM-19 describes the new MSA All-Vision dust mask designed for complete facial and respiratory protection against nuisance and harmful dusts.

GAS CUTTERS—Air Reduction Sales Co., 60 E. 42nd St., New York 17. Bulletin ADC528C on two pantograph-type gas-cutting machines, the Oxygraph and the Travograph, covers applications, features and operation, with details on the four tracing devices used in machine gas cutting; electronic, magnetic, manual and spindle.

GENERATOR SETS—International Diesel Electric Co., Inc., 13-02 44th Ave., Long Island City 1, N. Y. Bulletin 112 describes the International line of complete packaged power in the form of diesel- and gasoline-engine-driven generator sets designed for emergency or continuous service, ranging in capacity from 5 to 250 kw.

MAGNETIC SEPARATORS—Eriez Mfg. Co., 1224 E. 12th St., Erie, Pa. Bulletin entitled "Permanent Magnets and Metal Detectors for the Mining Industry" contains illustrations and detailed information on the use of permanent magnets and metal detectors, with cost-saving features and pertinent installation suggestions.

MERCURY SWITCHES—Minneapolis-Honeywell Regulator Co. Brown Instruments Division, Wayne & Roberts Aves., Philadelphia 44. Catalog 1242 describes a number of Honeywell mercury switches with details of features and applications of the two basic types—mercury-to-electrode and mercury-to-mercury—plus engineering data, selection tables and switch specification charts.

WIRE-CAR COUPLER—American Steel Foundries, 410 N. Michigan Ave., Chicago 11. Bulletin covers design, operation and features of couplers for use on mine and other cars and locomotives said to feature exclusive de-



TIME... Coal Mining's Most Vital Factor

Time never changes . . . but check up on its increased cost over the past ten years.

Down time today means costly, unproductive waste. Little wonder operators are looking for efficient, high capacity loading machines, such as the Whaley "Automat," that will consistently work the most hours, the most days, week-in, week-out.

The Whaley "Automat" loading machine is built to take the punching. It has a reputation for consistent, efficient operation over long periods with minimum delays. This fact alone makes it worthwhile for you to consider the Whaley "Automat" now.

**Myers
Whaley**

THE AUTOMAT'S RUGGED CONSTRUCTION GUARANTEES AN ABSOLUTE MINIMUM OF LOADER BREAK-DOWN DELAYS.

THE AUTOMAT'S SIMPLICITY GUARANTEES A QUICK REPAIR AND EARLY RETURN TO LOADING.

RESULT—CONSISTENT, SATISFACTORY LOADING IN ANY CLASS OF MATERIAL.

"Mechanical Loaders Exclusively for Over 40 Years"

KNOXVILLE

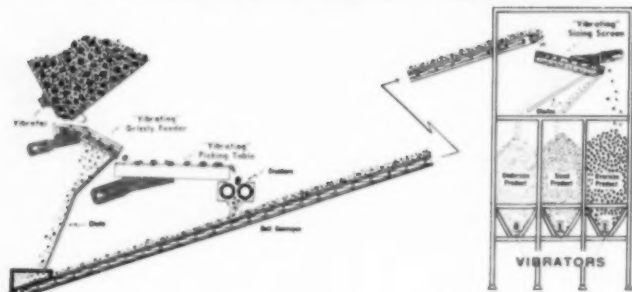
TENNESSEE

COAL PREPARATION for the Small Operator!

SYNTRON

"Vibrating"

PACKAGE UNIT



ELECTRIC VIBRATORS

On surge bins, assure a steady, dependable flow of coal to—

VIBRATING GRIZZLIES

that provide coarse sizing operation — bypassing fines — and controlling flow of coal to—



"VIBRATING" PICKING TABLES

moving oversize at a controllable rate—to crusher for reduction, and to—



VIBRATING SCREENS

grading the coal into three groups—oversize, undersize and sized—into VIBRATOR-EQUIPPED storage bins, ready to load cars or trucks.



LOW MAINTENANCE — LOW POWER CONSUMPTION

There are no motors, bearings, eccentrics, etc., on Syntron Vibratory Equipment, that eat up power and require maintenance. Syntron provides complete flexibility of operation. Individual controls for each machine, and/or a master control to operate all machines simultaneously.

Write for data.

SYNTRON CO.

975 Lexington

Homer City, Pa.

sign and offer unusual safety and service.

PAVING BREAKERS—Worthington Pump & Machinery Corp., Harrison, N. J. Bulletin H-1209-B40 describes Worthington Blue Brute paving breakers and sheeting drivers and includes features, operation and specifications.

PIPE—Taylor Forge & Pipe Works, Inc., Box 485, Chicago 90. Bulletin 493 lists the sizes and wall thicknesses of Taylor Spiral-Weld pipe available from plants in Carnegie, Pa., and Fontana, Calif., with information on Taylor forge fittings and flanges for use with Spiral-Weld pipe.

RESPIRATOR—Mine Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 3, Pa. Bulletin CR-23 describes the new MSA gas-fume respirator designed to combine working comfort with protection against mists, dusts, fumes, organic vapors and acid gases.

PUMPS—De Laval Steam Turbine Co., Trenton 2, N. J. Catalog 1559 describes opposed-impeller pumps available in pressures to 1,000 psi for various services, including mine drainage, water supply and general hydraulic service, with details of two- and four-stage units, and rating and dimension tables.

REFLECTORS—American Gas Accumulator Co., 1027 Newark Ave., Elizabeth 3, N. J. Bulletin illustrates and discusses use of Stimonite all-plastic reflectors for highway signs and other applications where readability at night is desired.

SCREEN CLOTH—Robins Conveyors Division, Hewlett-Robins, Inc., 270 Passaic Ave., Passaic, N. J. Bulletin 113-A on Robins woven-wire screen cloth includes numerous tables to determine at a glance the sizes of openings available for a given diameter of wire, recommendations for selecting the best wire-diameter for a specific type of service, and a description of enamel-coated screen cloth, a new product reportedly offering a greatly lengthened screen cloth life in processing corrosive and abrasive materials.

SHOVEL CRANES—Link-Belt Speeder Corp., 1291 Sixth St., E. W., Cedar Rapids, Iowa. Catalog 2356 covers applications, specifications and capacities of the Link-Belt Speeder LS-51, a ½-yd shovel-crane equipped with full hydraulic controls. Catalog 2312, on the LS-71, a ¾-yd shovel-crane, illustrates the unit as a shovel, crane, dragline and trench hoe and discusses features and applications.

STORAGE SHELVING—Frick-Gallagher Mfg. Co., 401 Shubert Bldg., Philadelphia 3. Bulletin on rotating and straight-steel shelving outlines savings obtained from efficient shelving layout, with description of straight-steel shelving and various types of Rotablin rotating units in use singly or in combination with straight shelving or counters.

TRANSMISSIONS—Fuller Mfg. Co., Kalamazoo, Mich. Bulletin covers the entire line of Fuller heavy-duty transmissions, with complete details of ratios, dimensions, equipment, capacities and recommended applications.

VIBRATION-ISOLATION MOUNTING—Korfund Co., 48-14A 32d Place, Long Island City 1, N. Y. Bulletin LK551 illustrates typical equipment installations calling for highly efficient vibration, shock and noise isolation, with descriptions and specifications of six sizes of isolation mountings utilizing steel springs as isolating medium together with resilient snubbers to absorb lateral thrusts, for a loading range from 75 to 12,000 lb per isolator.

WIRE-ROPE SOCKETS—Wire Rope Institute, Shoreham Bldg., Washington 5, D. C. Bulletin 1 on wire rope sockets lists industry-standard dimensions, weights, etc., compiled by the wire-rope industry's engineers.

WICKWIRE ROPE

A PRODUCT OF

CF&I

Ask any user...you'll find them everywhere

In scores of industries, users of Wickwire Rope have developed an affectionate respect for its performance, safety and long life. And, for true economy, they use Wickwire's **WISSCOLAY®** Preformed. It lasts longer—is easier to cut, splice and install. It's kink-resistant and safer to handle. Wickwire Distributors and Rope Engineers, in key cities everywhere, are prepared to render prompt service in meeting your wire rope needs. Wickwire Rope Sales Office and Plant—Palmer, Mass.

IN THE EAST—Wickwire Spencer Steel Div. of C. F. & I.
500 Fifth Ave., New York 18, N. Y.

IN THE ROCKIES—The Colorado Steel and Iron Corp.
Continental Oil Bldg., Denver, Colo.

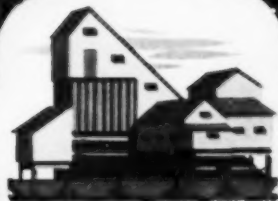
ON THE WEST COAST—The California Wire Cloth Corp.
1080—19th Ave., Oakland 6, Cal.



TRANSPORTATION



LOGGING



MINING



PETROLEUM



MANUFACTURING

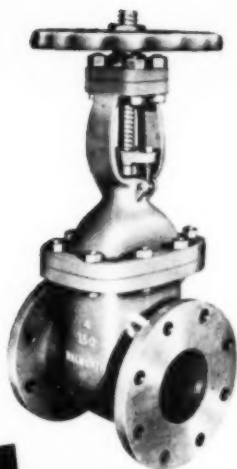


CONSTRUCTION



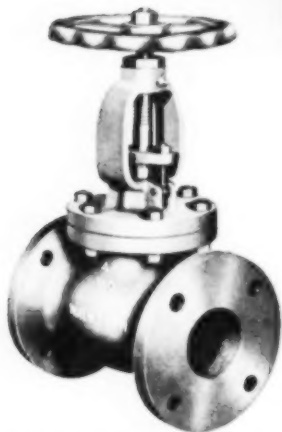
MARINE

Newly Designed
Walworth
Valves
to combat
corrosion



Walworth 150-pound Stainless Steel Gate Valve
 . . . available in sizes 1/2 to 3-inch, screwed;
 1/2 to 12-inch, flanged.

Made of Stainless Steel
 Monel · Nickel
 Acid-resisting Bronze
 Ni-resist



Walworth 150-pound Stainless Steel Globe Valve . . . available in sizes 1/2 to 3-inch, screwed; 1/2 to 6-inch, flanged.

— ENGINEERED

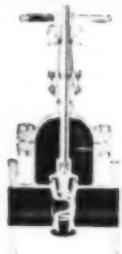
AND TESTED FOR TOUGH . . . HARD SERVICE

Walworth offers a comprehensive line of valves made of several cast stainless steels and special alloys for piping services where corrosion is a factor. These valves are available in Gate, Globe, Angle, Check, and Lubricated Plug types.

Gate, Globe and Angle Valves have outside screw and yoke construction, thus keeping the stem threads out of contact with the corrosive material in the line. They also have a two-piece bolted gland with ball-type gland follower to prevent binding the stem when packing bolts are tightened. Gland eye-bolts can be conveniently swung out of the way without danger of loss when the gland is lifted for repacking.

Gate Valves have taper seats with a unit consisting of two flat faced discs supported by a carrier on the end of the stem. The discs are of a proven ball-and-socket type. They are free to rotate and adjust themselves to the body seat angles, assuring tight seating with no possibility of sticking in any position.

For further information about Walworth's full line of corrosion-resistant valves, see your Walworth distributor.



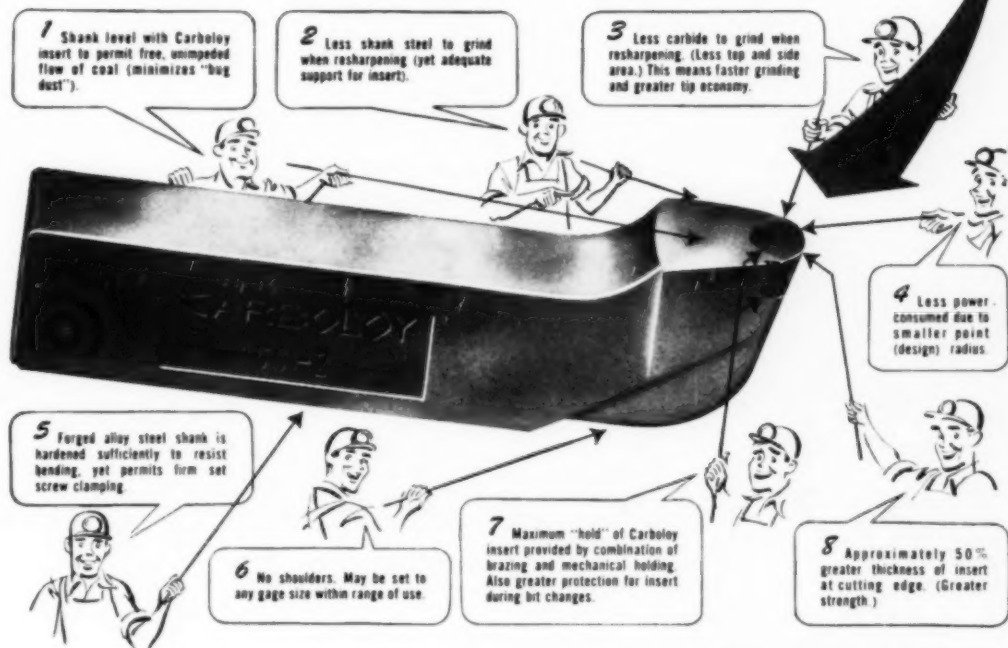
Sectional view of Walworth 300-pound Stainless Steel Gate Valve . . . available in sizes 2 to 6-inch, flanged.

WALWORTH
valves and fittings

60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

Only the Carboloy Bit gives you these 8 big advantages!



YES, Carboloy Company now offers you an improved, heavy-duty coal cutter bit that provides eight outstanding advantages!

Exclusive Carboloy design features make possible a cutting edge of uniform greater thickness that gives vastly increased strength. Yet the tip can be resharpened faster and easier. Maximum "hold" for the insert of Carboloy Cemented Carbide—the hardest metal made by man—is assured by brazing plus mechanical holding.

These are only a few of the advantages that team up to give you new bit economy, increased speed and efficiency.

Why not mail the coupon now for prices and information or a demonstration of this improved, money-saving bit. It can be used with any coal-cutting machine that takes size $\frac{1}{2}$ " x 1" bits—including "continuous" type machines. Carboloy Company, Inc., 11120 E. Eight Mile Road, Detroit 32, Michigan.

CARBOLOY® CEMENTED CARBIDE COAL CUTTER BIT

Carboloy Company, Inc.
11120 E. Eight Mile Road
Detroit 32, Michigan

- ☐ Without obligation we would like to have the CC-2 heavy-duty bit demonstrated.
- ☐ Please send prices and information.

Name _____ Title _____

Company _____

Street Address _____

City _____ Zone _____ State _____



SAVES OVER \$6,000 A YEAR

A Sun Mine Car Grease Cuts Breakdowns, Reduces Wheel and Axle Replacements

A coal mining company operating some 1,000 cars averaged 85 worn wheels and axles a month. The many breakdowns reduced tonnage and ran up costs—especially when they occurred underground. Some of the wheel failures were the result of normal wear, but faulty lubrication caused a large percentage of them.

One of our engineers, asked to make a survey of the operation, recommended a Sun Mine Car

Grease. Changing to this "Job Proved" Product, the company noticed an immediate improvement. Wheel and axle life has increased, and there has been a sharp reduction in replacements. Savings are estimated to be at least \$6,000 a year, not counting the production gained from steadier output.

Due to the superior performance of the Sun Mine Car Grease, the operators have turned to Sun for almost 100 percent of their petro-

leum needs—even to cutting oils in the machine shops.

This is typical of how Sun "Job Proved" Products sell themselves, once they are given an adequate trial. Sun provides the proper lubricants to prolong the life of present machines and to make available the least expensive form of production insurance for new equipment. For complete information call the nearest Sun Office. The services of a Sun Engineer are available without obligation.

SUN OIL COMPANY • Philadelphia 3, Pa.

*In Canada: Sun Oil Company, Ltd.
Toronto and Montreal*

SUN PETROLEUM PRODUCTS

"JOB PROVED" IN EVERY INDUSTRY





Government Action Seen As Coal Talks Bog Down

PROSPECTS OF GOVERNMENT INTERVENTION in the affairs of the coal industry loomed stronger as the current bituminous stoppage affecting mines east of the Mississippi went into its second month late in October. Operator representatives walked out of the White Sulphur Springs conference Oct. 21, maintaining that John L. Lewis had refused to bargain collectively and was showing utter disregard for miners and the industry by flaunting his power to dictate how many days, if any, the mines would work. Mr. Lewis had been present only eight days since July 1 and for a total of 2 hr in the two weeks since the meetings had been reconvened at the request of the government's mediation service, they said. Continuation of the present high wage contract had been offered if union leaders would assure them that miners would work every day business was available, operators reported. When union leaders show some disposition to consider employees and the industry, they would resume negotiations, they said. The Bluefield conference recessed Oct. 21 until Oct. 25.

In Washington, President Truman continued to parry all inquiries as to the government's plans. It was reported that White House aides were studying the possibilities of seizure. John L. Lewis' announced intention of ignoring any fact-finding board outside of the law made it likely that the President would have to invoke the machinery of the Taft-Hartley law, as much as he would prefer otherwise, if he desired that mode of settlement.

Wide Unemployment Anticipated

Meanwhile, wide-spread unemployment throughout the country was expected to increase rapidly, as a result of the twin strikes in steel and coal. Secretary of Commerce Sawyer predicted Oct. 16 that 2,000,000 workers would be out of jobs if the steel strike continued until Nov. 1 and that there would be 5,000,000 unemployed as of Dec. 1 because of it.

The effects of the nation-wide stop-

Featured in This Section

Personal Notes	p. 134
Obituaries	p. 134
New Developments	p. 134
Association Activities	p. 136
Coal and Business Activity	p. 138
Foreign Developments	p. 142
Preparation Facilities	p. 144
Editorial—J. H. McGraw Jr.	p. 144
National Coal Annual Meeting	p. 146
AIME Midyear Meeting	p. 150
Coal Publications	p. 172

page were eased somewhat Oct. 3, when on UMWA orders anthracite miners and 22,000 bituminous miners west of the Mississippi returned to work. The resumption of mining in these areas was designed to relieve the fuel situation of domestic and public users, it was said. In its telegram to district officials, UMWA headquarters said: "The suspension of mining in Western and anthracite areas is not now vital to the pending wage negotiations. To minimize loss to all parties, all mine workers in the aforementioned areas are requested to return to work and resume coal production Monday, Oct. 3, until further notice. . . ." The telegram proved, operator representatives maintained, that the stoppage was not a spontaneous protest over the breakdown of the welfare fund as the union had contended.

The first publicly reported estimate of the cost of the UMWA demands

was given by Mr. Lewis Oct. 13 in an unannounced press conference held while negotiations were going on. The mineworkers' demands, he said, constituted a "modest program" of contract improvements that would increase coal cost by 30 to 35¢ a ton and should cost consumers nothing because the operators had the profits to pay for it and labor costs were steadily going down. Mr. Lewis reportedly left the conference as though he were taking a short stroll and met 10 reporters in another room where he talked for 65 min. The union can win the dispute, he said, if the government feels it necessary to seize the mines, he suggested, it should execute a bona fide seizure and operate them "on account of the people and the government, and independent of the operators."

Lewis Charges Steel Lockout

At the same time, Mr. Lewis accused large financial interests of "a gigantic lockout" in both the steel and coal industries, the losses from which could be deducted from income tax payments. Two days later, the UMWA Journal in its issue of Oct. 15 charged that "steel interests" had ordered a new coal contract delayed until the steel strike was settled. Mr. Lewis had followed his surprise press conference by releasing on Oct. 14 the contents of a letter to William Green, president of the AFL, in which he proposed that nine AFL unions join with the UMWA in contributing \$2,500,000 weekly in support of the CIO steel strike. A "vast and barbaric attack" had been started against the steel workers, he wrote. "Formidable enemies are out to crush the power and destroy the structure of the steel workers' union. This must not happen,



THIS MONTH'S COVER shows the 90-ft-high 780-ft-long steel trestle which is a part of the recently built 2-mi outside haulway connecting the Piney Fork plant with the new Henderson Run mine of the Jefferson Coal Co. (a Hanna affiliate). In case you missed it, the October *Coal Age* included a thorough description of management and operating methods at this carefully planned, highly systematized new mine.



GAS FLOWING from electrode pipe shows how . . .

Electricity Makes Gas From Unmined Coal

High-voltage electricity sweeping through an unmined seam of coal has produced an oil-rich gas of 500- to 600-Btu heat value in field tests recently undertaken on properties of the Sinclair Coal Co. at Hume, Mo. The field tests, which followed laboratory investigations at the Missouri School of Mines, Rolla, Mo., indicate that electrocarbonization of coal in place may be accomplished successfully on a commercial scale.

For the field tests, drill holes are driven from the surface into a seam of coal. Iron pipes are inserted into the holes to act as electrodes. Connected with the electrodes is a series of pipes a few feet above ground. The gas, when generated, passes upward through the electrodes and then into the series of connected pipes.

The coal is gasified when a high-voltage current, controlled by a water rheostat, is sent down through the electrodes into the 2½-ft-thick seam. Heated by its resistance to the current, the coal is gasified. After the coal becomes hot enough to start burning, the electric current is cut off and air or oxygen is pumped into the porous coked seam to maintain further combustion.

Moisture is removed as the gas passes through a water collector lo-

cated where the electrodes converge into a single pipe. The gas then passes through a flow meter and a cooling tower before being discharged.

Gas made by electrocarbonization can be used as a raw material for production of synthetic liquid fuels or fuel gas. Some oil-tar has been collected along with gas at Hume.

About \$30,000 has been spent on the experiments in the last two years, according to Dr. J. D. Forrester, chairman, mining department, Missouri School of Mines, who, with Dean Curtis L. Wilson, has been directing the project. Mr. Erich Sarapu, research fellow in the School of Mines & Metallurgy, is making the laboratory and field tests. Field work was arranged through L. Russell Kelee, president, Sinclair Coal Co. T. C. Cheasley is the Sinclair official in charge of the project.

Latest field tests have been designed to determine whether underground electrical carbonization is economically sound. With this in view, instruments have been set up to measure current input and gas production. In addition to utilizing unmined coal, researchers are scanning the possibility of using similar methods to recover oil from depleted or abandoned fields and to carbonize deposits of shale.

it need not happen." The nine AFL unions and the UMW could each contribute \$2,500,000 weekly "for an indefinite period without strain, inconvenience or burden to their membership," he maintained.

In a prepared statement Oct. 15, Philip Murray, CIO president, joined with the Lewis labor unity idea by proposing that the three groups set up a war chest "for the common defense and general welfare of the labor movement" but did not refer to Mr. Lewis' suggestion that the AFL and UMW assist the steelworkers. Mr. Green, replying to Mr. Lewis Oct. 17, rejected the proposal, writing that "the pooling of labor's resources, while divided as it is today, is impossible and impracticable." He said

that he had not submitted the proposal to the presidents of his international unions and asked whether Mr. Lewis had received a request for financial assistance from Mr. Murray.

Earlier, violence flared in many coal fields throughout the country as non-union strip and deep mines in various sections reopened late in September. Returning workers carried guns and in Pennsylvania and Virginia state police protection was provided for several days. There were numerous reports of gunfire, dumping of coal trucks, beatings and other interference in many areas. One union miner reportedly died Oct. 9 in Jasper, Ala., of injuries received in a battle at a non-union mine. A driver was killed Oct. 3 near Grundy, Va., when

a boulder crashed into the truck in which he was hauling non-union coal. Two tipples in Pennsylvania were dynamited Sept. 29, it was reported, with damage at one of them, the June-dale Coal Co., Grass Flat, totaling over \$10,000. In Kentucky, a dynamite explosion Oct. 7 wrecked the tipple of the Green Grove Coal Co., near Providence, with damage reported at \$50,000.

In West Virginia, non-union operators in two areas obtained court injunctions preventing picketing and other interference with their operations. Arrests by state police were reported in several states. By mid-October, however, violence had generally abated, with indications that non-union production was continuing. In Virginia, Gov. Tuck Sept. 29 called the state Council of Defense back into action and provided it with wide powers to insure a supply of coal required for essential state needs. Some 10,000 tons a day was being mined under the state's program mostly from strippings, it was reported. In Illinois, the PMWA joined with operators in extending the present contract through Oct. 31.

Trustees of the UMW Welfare and Retirement Fund were defendants in a suit demanding an accounting of the Fund filed Sept. 22 in the U. S. Federal district court for the District of Columbia. George H. Livengood, a miner and financial secretary of Local 6308, Fayette County, Pennsylvania, who started the action, charged that the trustees had "wrongfully dissipated" the fund payments. Mr. Livengood reportedly was later removed from his post as an officer of the local. Mr. Lewis and Sen. Bridges, neutral trustees filed identical denials of the charges in the court Oct. 12, and at the same time Ezra Van Horn, the operators' trustees, asked for additional time to reply. On Sept. 23, it was reported, John P. Hickey, Totz, Ky., a 69-year-old retired miner, asked the Harlan County (Ky.) circuit court to approve a pension from the Fund for him, maintaining that he was eligible but had been unable to obtain it.

Coal Operator Builds His Own Railroad

A 4½-mile railroad line has been built by W. D. Corley Jr., Colorado Springs, Colo., to haul coal from his mine near Florence to the Santa Fe spur, which ends at Rockvale. Except for a few ties still to be laid, the short line was reported to be complete Sept. 28. The rail line will cost less than truck haulage, Mr. Corley says.

Mr. Corley obtained title to the old Santa Fe right-of-way between Rockvale and Kenwood. His equipment includes a locomotive and one car. In the next year, Mr. Corley says he will build a 1¼-mile addition to his track-age.



The CHANCE PROCESS

**LEADERSHIP...won by merit
... maintained by continuous
good service**



**THE HEART OF THE
PREPARATION PLANT**

The leadership gained and held by the Chance Sand Flotation Process is a result of an unbroken record of coal-cleaning success . . . at mines of every size . . . in all bituminous fields.

The Chance Process—the original heavy-density coal cleaner—excels in high separating efficiency, dependable performance, flexibility, low cost per ton of coal cleaned.

UNITED ENGINEERS & CONSTRUCTORS INC

NEW YORK 17

PHILADELPHIA 5

CHICAGO 2

WITH A BACKGROUND OF OVER SIXTY YEARS' EXPERIENCE

Personal Notes

Edward H. Evans, general manager, Page Coal & Coke Co., Pageton, W. Va., since 1913, retired Sept. 12. Mr. Evans, who will be 75 next Jan. 5, first worked for the Crozer Coal & Land Co., a Page affiliate, before attending West Virginia University, returning to the company after his graduation from that institution. He first succeeded his father, Samuel Evans, as superintendent of the Crozer company and on his father's death in 1913 succeeded him as general manager of the Page operations. Mr. Evans plans to make his home in Bluefield, W. Va. **Everett L. Poe**, formerly assistant to Mr. Evans, has been named to succeed him as general manager.

A. T. Lowmaster, formerly executive vice president, C. & O. Ry. Co., has joined the Amherst Fuel Co., Charleston, W. Va., as advisor to Herbert E. Jones, president of the company. Mr. Lowmaster, who has retired from the C. & O., will have offices in the Central National Bank Bldg., Richmond, Va.

Richard W. "Dick" Storey has been promoted from assistant to chief engineer, Consolidation Coal Co. (Ky.), Jenkins, Ky.

Harold Watkins, superintendent, Kehoe-Marcy mine, Kehoe-Berge Coal Co., Pittston, Pa., has been named superintendent of the company's Red Ash mine in addition to his duties at Kehoe-Marcy. **Herbert Nash**, formerly section foreman and safety engineer at Kehoe-Marcy, has been appointed foreman of the Red Ash operation.

Dr. Clifford W. Seibel, supervising engineer of the U. S. Bureau of Mines' helium plants, has been named director of Region 6, one of the nine regions recently set up under the Bureau's reorganizational plan (*Coal Age*, October, p. 176). Region 6, which will be known as the South Central region, with headquarters at Amarillo, Tex., comprises Kansas, Missouri, Oklahoma, Arkansas, Louisiana and Texas.

The appointment of **Myles E. Altimus Jr.**, Nanty Glo, Pa., **Joseph L. Walker Jr.**, Rimersburg, Pa., and **Michael Zulkoski**, Ansted, W. Va., to positions on the staff of the Mineral Industries Extension Services, Pennsylvania State College, was recently announced by D. C. Jones, director. Mr. Altimus, a 1946 graduate of Penn State with experience in central Pennsylvania coal fields, replaces Harold Davis, who resigned recently to join the staff of *Coal Age*. Mr. Walker, a 1948 graduate of Pitt, has had experience in the coal fields of southern West Virginia and western Pennsylvania and will assist in the mining extension work generally, with emphasis on the engineering and preparation phases. Mr. Zulkoski, a 1943 graduate

of West Virginia University, has worked in the northern and southern fields of West Virginia and will assist in the development of supervisory training programs for mine officials.

Rudolph G. Wuerker, lecturer, University of California, has been appointed assistant professor of mining and metallurgical engineering, University of Illinois.

Paul Gill has been named chief mining engineer of the operating properties of the Clearfield Bituminous Coal Corp., Indiana, Pa., according to an announcement by T. F. McCarthy, vice president and general manager. C. C. Watson has been appointed land development engineer.

John L. Auch has resigned as vice president, Pittsburgh Consolidation Coal Co., to become executive vice president, Great Lake Pipeline Co., Kansas City, Mo.

D. H. Devonald, formerly vice president in charge of operations, has been named vice president in charge of labor relations and development, Peabody Coal Co., Chicago. **Frank L. White**, previously assistant vice president, has been elected vice president in charge of mine operations, to succeed Mr. Devonald.

Obituaries

Rolfe M. Hite, 82, president, Virginia & Pittsburgh Coal & Coke Co., Fairmont, W. Va., and one of the pioneer coal operators of Northern West Virginia, died Sept. 19 in Fairmont. Mr. Hite moved to Fairmont in 1890 and soon afterwards organized the Virginia & Pittsburgh company. Previously, he had been active in the coal industry in Ohio and had been associated with the Tennessee Coal & Iron Co. in Virginia and Kentucky. Mr. Hite also organized the Potomac Valley Coal Co. in 1905 and in 1920 helped form the Edna Gas & Coke Co. and the Lucile Gas & Coke Co. He had been active in business up until March of this year.

Homer M. Faust, research and fuel engineer, New York Coal Co., died recently of injuries sustained when his automobile was struck by a locomotive. Mr. Faust had been active in the work of Bituminous Coal Research, Inc., serving on its technical advisory committee.

Herman Kirby, 54, a member of the engineering staff of the Consolidation Coal Co. (Ky.), Jenkins, Ky., died Oct. 9 at the Benham, Ky., hospital as a result of injuries suffered in an automobile accident.

Morton L. Gould, 85, who retired some years ago as president of the Linton Coal Co. and other producing companies in Indiana, died Sept. 28 in Indianapolis. Mr. Gould served as

president of the National Coal Association in 1925.

Fred E. Douglas, 54, secretary and assistant treasurer, Pittsburgh & Midway Coal Mining Co., Pittsburgh, Kan., died Oct. 10 in Pittsburgh of a cerebral hemorrhage.

Fred W. Christman, 63, Harrisburg, Ill., mining engineer and special coal and farm agent for the New York Central R. R. Co., died Sept. 27. Prior to his present assignment, Mr. Christman worked in the Brazil, Ind., and Danville, Ill., coal fields. Formerly, he was a civil engineer with the C.C.C. & St. L. Ry. and also was active in the development of the Southern Illinois No. 5 coal seam.

Mrs. Rose Nicholson, 64, store buyer and one of the owners of the Elkhorn Jellico Coal Co., Whitesburg, Ky., died Oct. 13 at her home after an illness of several months.

Thomas Lee Porter, 84, retired coal and lumber operator of Eastern Kentucky and formerly head of the Porter Coal Co., Pikeville, died Oct. 12 at his home in Pikeville after an extended illness. Mr. Porter was active some years ago in the development of several Kentucky coal fields.

New Developments

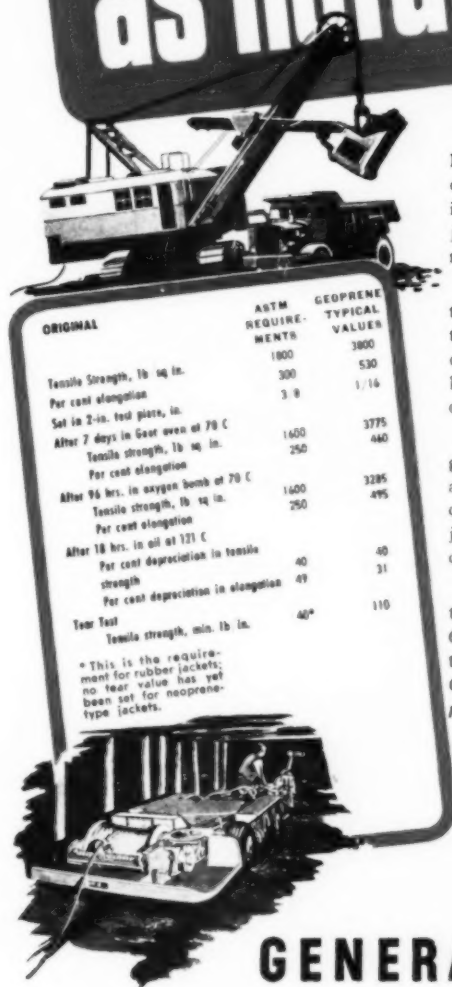
Purchase of the Valier, Ill., mine of the Valier Coal Co., subsidiary of the Chicago, Burlington & Quincy R. R., by the Old Ben Coal Corp. was reported early last month. The mine, which was closed down in mid-August because the railroad did not require its full production (*Coal Age*, September, p. 148), will not be taken over and reopened until Old Ben has completed the planning and construction of a new washing plant, which may require from two to three years, it was reported. The property will be maintained by the Valier company in the meantime. At the time of its closing, the mine was employing 650 men and producing approximately 6,360 tons daily.

Formation of a Coal Division by the Pittsburgh Mill Steel Co., New York, recently was announced. The company has acquired exclusive sales franchises from coal producers in the Pittsburgh and West Virginia areas and is presently negotiating for the acquisition of several coal producing properties in both the anthracite and bituminous areas. Announcement of the availability of coal from these mines will be announced when the negotiations are completed. Paul V. Forte, Philadelphia, has been retained as a consultant in the purchasing division.

Acquisition of the Roundup Coal Mining Co. properties in Montana by the Sheridan-Wyoming Coal Co., Inc., Monarch, Wyo., recently was an-

2½ times as tough as natural rubber

... you can't beat it
for service!



Drag it behind electric shovels and mining machines, run it on and off reels, use it in the tough spots where rugged duty is encountered . . . you'll find General Electric geoprene-jacketed portable cable, with its extra service life, helps to reduce operating costs.

Standard tests prove that geoprene jackets have 2½ times the tear resistance of natural rubber. Comparison with ASTM test requirements prove its superiority. Insulation for 75 C copper temperature permits maximum power for cable size, keeps weight down. The right number of fine wires in the conductors provides maximum flexibility, easy handling.

In addition to exceptionally valuable physical properties, geoprene has all of the other characteristics desirable in portable cable: superiority to rubber in resistance to heat, sunlight, oil, alkalis, acids and flame. General Electric geoprene-jacketed mine trailing cables carry Pennsylvania Department of Mines Approval No. P-108 for flame resistance.

For full information on the complete range of sizes and types available, write for the General Electric bulletin, *Geoprene Portable Cable*. It's fact-packed with the information you want to know. Just address Section W44-1114, Construction Materials Department, General Electric Company, Bridgeport 2, Connecticut.

**G-E Geoprene-jacketed
Portable Cables**

GENERAL  ELECTRIC

nounced by Walter J. Johnson, president, Sheridan-Wyoming. Located at Roundup, Mont., the property will be known as No. 3 Roundup mine and will have a capacity of 1,200 tons daily. Sizes to be shipped include lump, furnace and stove and oil-treated nut, stoker and slack. S. H. Clarke, former president of the Roundup Coal Mining Co., has been named manager, No. 3 Roundup Mine. J. J. Fisher Sr. and J. W. Fisher Jr., superintendent and mining engineer, respectively, continue in those positions for the newly acquired operation. John Nation, former top boss, has been made master mechanic and top boss.

Pittsburgh Consolidation Coal Co. reportedly has completed the purchase of 14,000 acres of Pittsburgh-seam coal in Monongalia County, West Virginia, from the Cochran Coal & Coke Co., at a reported price of \$4,200,000.

ICC authorization has been asked by the Pennsylvania R.R. and the Pittsburgh, Cincinnati, Chicago & St. Louis R.R. Co., to build 8.5 mi of railroad line in Harrison County, Ohio. The proposed line will open up an area containing an estimated 100,000-000 tons of coal available for stripping and deep mining. The Pittsburgh Consolidation Coal Co. will participate in the initial financing of the line, it was reported.

The Elkhorn & Jellico Coal Co., Whitesburg, Ky., is reportedly planning to open soon its new Kentucky-Sapphire deep mine in Letcher County. The operation will have a capacity of 3,000 tons daily and will ship via the L. & N.

Increased tonnage from 500 to 1,000 tons daily, with the purchase and installation of new equipment, is reportedly being planned by the Dry Fork Pocahontas Coal Co., Iager, W. Va.

The Union Coal Co., Inc., Burgettstown, Pa., recently opened its new Langeloth slope mine in Washington County, planned for a daily capacity of 500 tons and a life expectancy of 15 years. The Pittsburgh No. 8 seam will be mined and shipments will be made via the Pennsylvania R.R. Personnel include M. L. Scott, president, T. J. Wiggins, vice president and general manager, and C. Daniels, foreman.

The newly organized Book Cliffs Coal Co. has acquired the Blue Diamond mine at Horse Canyon, Carbon County, Utah, including 340 acres of property, part of which contains high quality semi-coking coal. New loading facilities will permit a production of 500 tons daily, according to E. S. O'Connor, Salt Lake City, president of the new firm. Production has averaged 200 tons daily, with shipment by truck, in recent years.

MEETINGS

• **West Virginia Coal Mining Institute and Central Appalachian Section, AIME:** joint meeting, Nov. 11-12, Summit Hotel, Uniontown, Pa.

• **Indiana Coal Preparation & Utilization Society:** annual meeting, Nov. 11, Terre Haute, Ind.

• **Harlan County Coal Operators' Association:** annual meeting, Nov. 16, Harlan, Ky.

• **ASME:** 70th annual meeting, Nov. 28-Dec. 2, Hotel Statler, New York City.

• **Coal Mining Institute of America:** annual meeting, Dec. 15-16, William Penn Hotel, Pittsburgh, Pa.

Progress at the new T'Sable mine of Canadian Collieries (Dunsmuir) Ltd., Vancouver Island, B. C., has been so satisfactory that the mine has been changed from a capital-expenditure to an operating basis as of July 1, it was reported at the company's annual meeting recently. While the company had expected to attain a daily production of 500 tons before converting to an operating accounting basis, the operation is presently earning about 35¢ a ton on a production of 400 tons daily. Production of 1,000 tons daily is scheduled for June, 1950.

Opening of a new open-pit mine on 1,800 acres of coal property recently acquired in the Forestburg area about 100 mi southeast of Edmonton, Alberta, by the Forestburg Collieries has been reported. The property is being developed to a potential production of 3,400 tons of domestic lump coal daily and output will be marketed by the Boon-Strachan Coal Co. in British Columbia, the western provinces and, possibly, Ontario. The company is reportedly investing \$1,600,000 in the property and all equipment, including an all-steel tippie and an electric dragline, was expected to be in operation at the end of October. The coal is sub-bituminous, with a Btu content of 9,500 to 10,000.

Association Activities

The Central Pennsylvania Coal Producers' Association and the **Eastern Bituminous Coal Association** held their annual meetings Sept. 22-23 at the Bedford Springs Hotel, Bedford, Pa. More than 200 members and guests attended and were guests of the National Coal Association for lunch Sept. 22 at which various NCA officials and staff members described the work of the association.

Newly elected officers of the Central Pennsylvania association are: J. William Wetter, president; T. F. McCarthy, vice president; Walter A. Jones,

secretary-treasurer; and C. P. O'Neill, assistant treasurer. Named directors, in addition to Messrs. Wetter and McCarthy, were: M. J. Ackerman, Thomas L. Aitken, Joseph T. Berta, L. C. Campbell, E. M. Cortright, R. J. Craig, A. B. Crichton, G. M. Gillette, C. J. Hannigan, R. M. Hess, John M. Kerr, John W. Krous, Archibald Miller, Ralph H. Moore, A. J. Palumbo, Richard Peale, William H. Ritter, David Robertson, Joseph G. Saricks, Charles M. Shoffner, Richard T. Todhunter Sr. and C. M. Schwerin Jr.

Officers elected for the Eastern Bituminous Coal Association are the same as above, with the exception of the vice president, who is W. H. Taylor. Directors include: Thomas Barnes II, Joseph T. Berta, Charles G. Berwind, Nathan Cortright, F. A. Fontyn, J. W. McGinn, John B. Mull, C. M. Watt, J. William Wetter, R. W. Wighton, Heath S. Clark, A. B. Crichton, Ralph H. Moore, William H. Ritter, Charles M. Shoffner, R. S. Walker, W. H. Naylor, Charles A. Owen and Rembrandt Peale.

Greater Capacity Asked For New York Pipeline

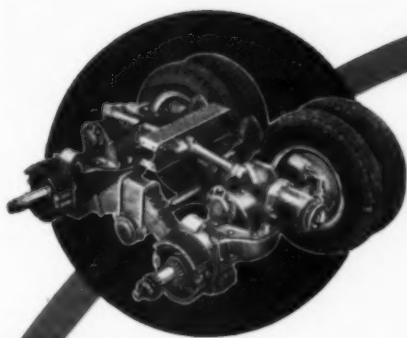
The Transcontinental Gas Pipe Corp. has requested permission from the FPC to expand its Texas-New York City natural-gas pipeline now under construction from the presently authorized capacity of 340 million cu ft daily to an output of 505 million cu ft. The company plans to increase deliveries to its presently authorized utility customers and to extend service to two others.

The two new customers to be served under the plan are the South Jersey Gas Co. and the Northeastern Gas Transmission Co. Northeastern is already seeking FPC authorization to construct a 511-mi pipeline for the transportation and sale of natural gas in the six New England states.

The expanded program sought by Transcontinental calls for additional compressor capacity, substitution of 362 mi of 30-in pipeline for 26-in now authorized and construction of 36 mi of pipeline from New Jersey to the New York-Connecticut border.

1,000 Hudson Coal Miners Begin Accident Course

Some 1,000 miners employed at three collieries of the Hudson Coal Co., Scranton, Pa., Oct. 4 started a 16-hr course in accident prevention sponsored jointly by the company and the UMW. The current course, which being conducted by instructors from the U. S. Bureau of Mines and consists of eight two-hr sessions held twice a week, is being attended by employees of the Lafin, Delaware and Pine Ridge collieries.



ONLY MACK offers this matchless Balanced Bogie with exclusive Power Divider. Unusual flexibility and balance insure even tire loading and uniform braking; cancel out weight transfer. Mack Power Divider assures good going by transferring power to wheels maintaining the best traction.



MACK TRUCKS

Built to

take it

... and **TAKE IT AWAY**

in bigger loads . . . on faster schedules . . . with greater profits

Mack six-wheel trucks are built to "take it" when it comes to taking out the big loads with power and stamina to spare.

Powerful gasoline or diesel engines! Massive, heat-treated alloy steel frames! Flexible rubber Shock Insulators! Air Assist Clutch and Power Steering! Mack's famed Balanced Bogie and Power Divider! These are your assurance of power and strength for the heaviest loads; maneuverability and ease of control for fast loading and unloading; flotation and traction for the most slippery mud or sand.

Whether for heavy highway hauling or super-duty off-highway work, Macks are designed with more outstanding and exclusive features than any other truck—features that mean greater profits through stepped-up tonnage on faster schedules. It will pay you to get the full story in terms of your particular operation. Write or call your nearest Mack branch or dealer.



IT'S PART OF THE LANGUAGE.

Built Like a **Mack** *Truck*

Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Limited.

Coal and Business Activity

		1949 to This Date	1949 Over 1948, to Date
Est. anthracite prod., week ending Oct. 8	1,099,000	31,394,000	-29.5%
Est. bituminous prod., week ending Oct. 8	2,210,000	341,633,000	-25.2%

Source: U. S. Bureau of Mines.

	Bituminous Coal Stocks (Thousands, net tons)				Consumption (Thousands, net tons)		
	Sept. 1, 1949	Days' Supply	Aug. 1, 1949	Sept. 1, 1948	Aug., 1949	July, 1949	Aug., 1948
Electric power utilities	25,458	117	25,062	21,107	6,732	6,168	8,203
By-product coke ovens	13,604	57	12,896	10,289	7,384	7,006	8,349
Beehive coke ovens	1	1	1	1	27	44	965
Steel and rolling mills	1,152	65	1,214	1,166	551	505	706
Cement mills	1,454	70	1,469	1,328	641	629	719
Other industrials	15,912	66	16,089	16,810	7,485	6,514	8,498
Railroads (Class I)	8,196	49	8,669	8,685	5,133	4,974	7,467
Retail dealers	2,843	16	2,720	2,672	5,861	4,042	5,496
Total	68,621	63	69,119	64,057	33,589	29,884	40,403

Source: U. S. Bureau of Mines. †Not available. ‡Retail dealer deliveries.

	Latest Week*	Month Ago	Year Ago
Business Week Index of Business Activity, wk. ending Oct. 13	161.2	185.0	196.7
Steel ingot operations (% of capacity)	9.3	86.2	99.1
Electric power output (million kw-hr)	5,481	5,579	5,482
Crude oil production (daily avg., 1,000 bbl)	4,985	4,845	5,586
Misc. & L.C.L. carloadings (daily avg., 1,000 cars)	67	75	87
All other carloadings (daily avg., 1,000 cars)	29	50	62
Prices, spot commodity index (Moody's, Dec. 31, 1931 = 100)	336.1	348.1	405.5
Prices, industrial raw materials (B.L.S., Aug. 1939 = 100)	224.0	230.4	275.6
Prices, domestic farm products (B.L.S., Aug. 1939 = 100)	292.5	300.9	326.2
Prices, finished steel composite (Iron Age, 1b)	3.705c	3.705c	3.720c
90 stocks, price index (Standard & Poor's Corp.)	126.1	123.0	128.7

*Date of latest week for each series on request.

High Export Level Seen by Association

A substantial overseas market for United States coal for some time to come was forecast at the fourth annual meeting of the Coal Exporters' Association of the U. S., Inc., held Oct. 4 at the Waldorf-Astoria Hotel, New York, with the following participating:

J. S. Routh, president of the association, and of the Routh Coal Corp., New York.

F. F. Estes, executive secretary, Washington.

J. W. Haley, general counsel, Washington.

John D. Battle, executive vice president, National Coal Association.

D. T. Buckley, chairman, committee on government relations, and assistant to the president, Castner, Curran & Bullitt, Inc., New York.

C. W. Brown, vice president, and president, C. W. Hendley & Co., Inc., Baltimore.

A. F. Kempe, chairman, transportation and advertising committees, and president, Seneca Coal & Iron Corp., New York.

Paul Sullivan, Maritime Commission, Washington.

Louis Lister, chief coal branch, ECA, Washington.

Overseas exports, it was pointed out, totaled 47,412,000 net tons in 1947, 22,196,000 tons in 1948 and 12,125,000 tons in the first eight months of 1949. July, August and September shipments dropped off severely in 1949 as a result of an improvement in the quantity—but not quality—of foreign-

produced coals, delay by Congress in appropriating ECA funds and the three-day work week.

In spite of the record of the past three months, however, a good level of overseas exports is expected in the future because supplies of coking and gas coal are limited abroad, leaving the United States as the only major source; vessel supply has been increased and steps have been taken to offset the extra cost of shipping in American vessels to conform with ECA requirements; shipping and port facilities are good, and exporting regulations have been eased or removed.

Problems include increasing the supply of dollars in the hands of foreign buyers, domestic freight rates to the ports, and certain remaining regulations covering the handling of foreign orders. Over all, as one speaker put it, the possibilities for the future depend upon three positive actions: "(1) Create your market, fight for it, make it what you want it; (2) service it, put the right coal where it is required; and (3) have the guts to keep moving forward and overcoming those influences set out to prove you wrong."

Blue Diamond Team Cops First-Aid & Safety Honors

The No. 2 team, Blue Diamond Coal Co. won first place and the No. 1 team of the same company took second place in the 19th annual Kentucky River Mining Institute first-aid and safety meet Sept. 24 at Hazard, Ky.

Third place went to Hardy-Burlington Mining Co., Hardburly, Ky. The winning Negro team represented the Old King Mining Co. Cash and trophies were awarded the winners.

Some 3,500 spectators who watched the meet saw the winning Blue Diamond team run up a perfect score. Fifteen teams were in the contest.

Court Delays Contempt Trial in Kentucky

A hearing on contempt-of-court charges against UMWA officials in western Kentucky was continued Sept. 24 after attorneys for both sides agreed. No date was set for a later hearing.

The proceedings grew out of alleged union violations of a no-picketing order issued May, 1946, by Judge H. F. S. Bailey on the complaints of the West Kentucky Coal Co. and Homestead Coal Co. Both companies operate non-union mines which were closed down last June and July by alleged mass picketing.

1949 Bituminous Annual Distributed by BCI

Distribution of a new and larger "Bituminous Coal Annual," replete with facts, charts and text pertinent to the bituminous coal industry, was begun by the Bituminous Coal Institute, Inc., late in September with single copies issued to NCA member companies and the coal-trade press. A subsequent reader demand for some 20,000 copies is anticipated from editors, economists, financiers, professors, librarians, teachers, statisticians, writers, and coal industry executives.

This year's "Bituminous Coal Annual" contains numerous statistical tables, illustrations, photos and discussions of coal's pervasive role in 20th Century industrial civilization. Beginning with the initial chapter on "Energy," the text and statistics detail coal's fundamental abundance among U. S. fuels reserves and provides a panoramic view of the industry itself. Individual chapters cover in detail industry facts on "Production," "Labor and Safety," "Transportation," "Markets," "Technology," "Combustion," "Chemistry," and "Finance," plus an outline of the NCA organization and a glossary of coal-mining terms.

The "Bituminous Coal Annual—1949" was developed under the supervision of Ralph C. Mulligan, BCI director of public relations. Dr. Walter L. Slifer, chief of the Institute's statistical and research section, and his assistant, John F. Degnan, assembled and organized the figures. Howard J. Carswell wrote the text; Ernest Melver was art and production editor, and T. A. Day is responsible for circulation.

*How does a
rayon belt stand up
in service?*

*Check this
2-year service record
for the answer*

There's nothing theoretical about the performance of this conveyor belt, made with Du Pont Cordura® High Tenacity Rayon. This 4-ply belt does just what designers figured it would do when it was installed two years ago to replace a 6-ply belt.

Users say it's the kind of belt you just don't notice! Day in, day out it does a satisfactory job in a typical outdoor installation. It's been covered with snow and ice through two severe winters . . . frozen to the pulleys . . .

**Look to "Cordura" Rayon
for these conveyor belt advantages**

- | | |
|---|---|
| ★ Greater tensile strength | ★ Lighter belts that are easier to set up |
| ★ Longer life | ★ Resistance to flexing |
| ★ Heavier loads | ★ Resistance to loading impacts |
| ★ Improved troughability | ★ Reduced operating power expense |
| ★ Longer lifts with fewer transfer points | |

always wet, carrying damp sand and gravel.

The extra strength of "Cordura" Rayon shows up in the fact that the belt has stretched very little. After the first month's service, the operators took it up 25". It has now completed two years of service without splicing.

This installation is an example of how "Cordura" packs strength into a conveyor belt. This belt is only about one-half as thick as the one it replaced—and 50% stronger!

For improved conveyor belt performance, get the facts on Du Pont "Cordura" Rayon. Ask your supplier. Or write Room 4527, Rayon Division, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

*REG. U. S. PAT. OFF.

**DU PONT "CORDURA"
HIGH TENACITY RAYON**



REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

for RAYON . . . for NYLON . . . for FIBERS to come . . . look to DU PONT

Anthracite Dealers Take Automatic Heating Course

Scores of dealers and officials of companies producing about 60% of the anthracite output have completed a one-day course that sells the soundness of automatically fired anthracite as a completely automatic fuel, cheaper and better than its competitors, oil and gas. Originated and given by the Electric Furnace-Man, Inc., stoker manufacturer, at its factory in Emmaus, Pa., since its inception July 26, the course is held twice a week and has attracted a number of top sales and producing officials.

Primary purposes of the course, it is reported, is to show dealers how stoker equipment makes anthracite a truly automatic fuel with strong competitive advantages and persuade them of the value of handling automatic equipment and pushing its sale among their customers. Anthracite's strong points are graphically outlined, with case-history examples demonstrated, and the program also discusses the specific business advantages for the coal dealer's going into the equipment business and offers advice on the best way to go about it.

"Every coal dealer in the country and every wholesale representative should attend this one-day course," said Frank W. Earnest Jr., president, Anthracite Institute, who attended the school with a number of producers late in September. "The program is an outstanding contribution to the industry," he continued. "For the first time, many important advantages of anthracite, as an automatic fuel, are made clearer to the dealers. It is automatic in the buckwheat, rice and other steam sizes used with stoker equipment, just as automatic as oil or gas. It is much cheaper—half the cost of oil in some cases—and provides an even, uniform heat impossible with gas or oil." Other producing officials were reported enthusiastic in their opinions of the school's value.

W. Va. Ruling Sought On Mine Inspection

The state attorney general's opinion on whether the law requires complete fireboss inspection on idle days was requested Oct. 14 by Arch J. Alexander chief, W. Va. Department of Mines. Mr. Alexander's action followed an inquiry by C. E. Jones, safety director, District 29, UMWA, who contended that under the law the entire mine should be inspected if men are working anywhere in it.

Present practice, Mr. Alexander reported, is for firebosses to inspect on idle days only those parts of the mines where maintenance or other work is being done, closing off all other sections. This practice was to be continued until the legal opinion was secured, he stated.

EQUIPMENT APPROVALS

Seven approvals of permissible equipment were issued by the U. S. Bureau of Mines in September, as follows:

Joy Mfg. Co.—CD26 drilling machine; one motor, 26 hp, 208, 220, 415 or 440 v, ac; Approvals 2-685 and 2-685A; Sept. 6.

Goodman Mfg. Co.—52T Timberman; one motor, 10 hp, 250 v, dc; Approval 2-686; Sept. 21.

Joy Mfg. Co.—PPS-IPE post puller; one motor, 10 hp, 250 v, dc; Approval 2-687; Sept. 21.

Albert & J. M. Anderson Mfg. Co.—Distribution box; two or three outlets, 250 v, dc; Approval 2-688; Sept. 22.

Joy Mfg. Co.—12BU-8PN longwall loader; five motors, each 3 hp, 500 v, ac; Approval 2-689A; Sept. 22.

Brown-Fayro Co.—LeBour pump; one motor; 3 hp, 250 v, dc; Approval 2-690; Sept. 23.

Joy Mfg. Co.—8BU-16E/F loader; one motor, 15 hp, 250 or 500 v, dc; Approvals 2-691 and 2-691A; Sept. 26.

Symposium Planned On Low-Rank Coals

A symposium on the geology of low-rank coals is being planned as a feature of the joint meeting of the Geological Society of America and the Society of Economic Geologists, to be held at El Paso, Texas, Nov. 10-12, according to Gilbert H. Cady, Illinois Geological Survey and chairman, coal research committee, Society of Economic Geologists, which made the arrangements for the discussions.

On the first of the two afternoon sessions, to be held in the Victory room of the Chamber of Commerce Bldg., Nov. 10, the speakers and their subjects will include: V. E. Parry, supervising engineer, U. S. Bureau of Mines, Golden, Colo., Production, Classification and Utilization of Western United States Coals; R. P. Bryson, U. S. Geological Survey, Washington, D. C., Distribution, Occurrence and Resources of Sub-Bituminous Coal and Lignite in the United States; B. R. MacKay, head, Coal Division, Geological Survey of Canada, Ottawa, Canada's Resources of Low-Rank Coal; H. B. Stenzel, geologist, Bureau of Economic Geology, Austin, Texas, The Coals of Texas; and W. B. Roe, assistant chief engineer, Truax-Traer Coal Co., Geological Features of North Dakota Lignites.

At the second meeting, to be held in the same room, Nov. 11, the following will participate: E. S. Barghoorn, Institute of Research in Plant Pathology, Harvard University, Geological

and Botanical Study of Brandon Lignite and its Significance in Coal Petrology; B. C. Parks, coal technician, U. S. Bureau of Mines, Pittsburgh, Petrography of American Lignites; Paul Averitt, U. S. Geological Survey, Status of Coal Resources Studies in the United States; and R. M. Kosanke, Illinois State Geological Survey, Review of Coal Geology Research, 1948-49.

ASME New York Meeting Offers Varied Program

The 70th annual meeting of the ASME to be held in New York City Nov. 28-Dec. 2 will feature more than 270 speakers, who will deliver some 200 papers on a wide range of topics, to make the program one of the most comprehensive ever offered by the society, it has been announced. It is expected that almost 6,000 engineers from all parts of the country will attend the meeting, which will have headquarters at the Hotel Statler.

In addition to the 78 technical sessions, there will be 16 luncheons and dinners. Fields to be covered in the program include: power, aviation, applied mechanics, fuels, gas turbines, heat transfer, hydraulics, industrial instruments and regulators, machine design, management, materials handling, metals engineering, oil and gas power, process industries, production engineering, railroad, rubber and plastics, textile and wood industries and petroleum.

The sessions on fuels will include papers on the effect of pressure on combustion of pulverized coal; new underground mining procedures; oil-shale processing; practical applications of the Anthratube; symposium on fly-ash utilization; report on the Illinois smokeless furnace; and gasification of pulverized coal in vortex reactor. A fuels luncheon will be held Wednesday, Nov. 30, with Richard Harkness, Washington correspondent for the National Broadcasting Co., speaking on "Behind the Scenes in Washington."

Miner Guilty in Roof-Fall Death of Two Workers

A veteran miner whose two laborers were killed in a roof fall last April 19 in the Red Ash mine, Kehoe Berge Coal Co., Pittston, Pa., was fined \$100 and sentenced to 30 days in jail Sept. 30 after a jury found him guilty of violating the timbering requirements of Pennsylvania mining law. The miner, Louis Vancheri, has worked in the mines since 1910 and has held a miner's certificate since 1913.

The prosecution charged that measurements taken the day following the

NOW ON RUBBER!

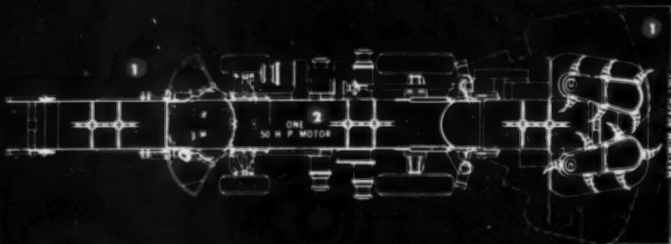
The CLARKSON

TYPE 28FA
UNIVERSAL

Redbird



New Versatility... the only completely mobile face loader on rubber tires.



- 1 Front and rear conveyors flex horizontally and vertically with fingertip push-button controls. Front head and chassis both swing, permitting closer work around face timber.
- 2 Only one 50 H.P. motor... no differential.
- 3 Front head raises and lowers 26" above floor line and 18" below floor line.
- 4 Extreme high road clearance.

Cool line 36"
Height 42"
Width 72"
Length 28'

The CLARKSON
MANUFACTURING CO.
Nashville
Illinois

accident showed a distance of 17 ft between the face and the last set of timber and that mining conditions required timbering every 4 to 5 ft. The defendant stated he was aware of the danger and had timber standing by ready to put up but was blocked by coal loosened by a blast at the face. He testified the distance from face to timber at the time of the roof fall was 11 ft after firing and 4 ft before firing. A fireboss and assistant mine foreman testified that they had ordered proper timbers erected before shooting the face.

New Diesel Switches Ordered by B. & O.

The Baltimore & Ohio R. R. Co. recently placed an order for 10 diesel-electric switching locomotives from the Lima-Hamilton Corp., Lima, Ohio. The addition of the 10 new 1,000 hp diesel switchers, which will be assigned to the Toledo division, will give the B. & O. a total of 213 units of this type of power, in addition to 58 road passenger and 112 road freight diesel-electric locomotives.

The new diesels are the first ordered by the B. & O. from Lima-Hamilton, which has just gotten into production on diesel-electric locomotives following the recent acquisition of the locomotive-building business of the Lima Locomotive Co.

BCR and Railroads Join In Program to Cut Smoke

In a further effort to cooperate with the county's smoke-control program, the railroads serving Allegheny County, Pennsylvania, and Bituminous Coal Research, Inc., have launched a research and development project aimed at reducing that part of air pollution resulting from fly ash and cinders emitted by steam locomotives.

Representatives of the two groups working for several months on the preparation of the program, have held meetings to study methods by which railroads operating steam locomotives in the county can more effectively comply with the new county smoke ordinance. As a result a special committee to be known as the Locomotive Cinder Collector Research and Development Committee has been formed to supervise the jointly financed program. This 11-man committee will direct the work that will include the design, construction and testing of a cinder- and fly-ash collection and disposal system suitable for conventional steam locomotives. It is expected that results of the program will have national application.

The effective control of cinder and fly ash, a provision of Allegheny County's smoke control ordinance, is in addition to regulations controlling

smoke from locomotives. These provisions of the ordinance were enacted after careful study by county officials, the Smoke Control Advisory Committee and the Railroad Subcommittee.

R. H. Flinn, assistant to the general manager, Pennsylvania R.R. Co., will serve as the committee's chairman. He represents the railroad subcommittee of the Allegheny County Smoke Control Advisory Committee.

Earl C. Payne, consulting engineer, Pittsburgh Consolidation Coal Co., and chairman of the BCR motive power committee; K. A. Browne, research consultant, C.&O. Ry., and chairman of the BCR locomotive-development program steering committee; and Harold J. Rose, BCR vice president and director of research, will represent the coal industry.

Representing the participating railroads will be: B.&O., W. E. Sample, superintendent of fuel conservation; Bessemer & Lake Erie R.R., R. C. Beaver, superintendent of motive power; Montour R.R., G. W. Covert, assistant superintendent; Pennsylvania R.R., W. L. Lloyd, assistant engineer; Pittsburgh & Lake Erie R.R., Karl Berg, superintendent of motive power; Pittsburgh & West Virginia Ry., F. G. Klassen, master mechanic; and the Union R.R., M. G. Stevens, superintendent of motive power. Additional railroads sponsoring the program are the McKeesport Connecting R.R., the Monongahela Connecting R.R., and the Pittsburgh & Ohio Valley Ry.

Name Appointees to Colorado Mine Board

Fred W. Whiteside, Denver, was re-appointed Sept. 27 as engineer member of the Colorado Board of Examiners of Coal Mine Inspectors. His appointment was announced by Gov. Knous. At the same time, Ernest Todd, Mt. Harris, and Leonard Ford, Valdez, were named respectively as miner and operator representatives on the board. A fourth appointment remains to be made. All members except the engineer representative are selected by district judges.

Blair Athol coal-stripping project because it saw little chance of obtaining the \$81,000,000 needed for getting under way. With a provisional franchise granted in 1947, the firm had planned to produce 3,250,000 tons annually, thus increasing Australia's output by 20%. Studies by English engineers indicated that the desired tonnage could be produced easily. However, they warned that the company would have to build a railroad to the coast at its own expense and develop and equip a harbor for handling the coal. The engineers doubted that these facilities could be obtained for \$81,000,000 and stated there would be no assured overseas outlets for the coal by the time the railroad could be completed in 1956. Production originally was planned for export to Canada and the Far East. Estimated cost of the coal, put down at an Australian port, was \$3.66 per ton. As an alternative to the original plan, Power & Traction Finance Co. now is proposing a partnership with the Queensland and federal governments to share risks and profits from the project.

BELGIUM—A steady shrinkage of export markets has pushed stocks of coal above ground to over 3,000,000 tons and may cause unemployment among coal miners by midwinter. Already, by the end of September, most mines had cut off one or two shifts per week, causing casual unemployment among some 40,000 miners. The decline in foreign markets is attributed partly to Marshall Plan subsidies, which lower the cost of American coal shipped to Europe, and partly to the high cost of Belgian coal. The Belgian price of about \$15 per ton is 66% higher than British coal and 55% higher than Ruhr coal. Since the war, the Belgian coal industry has been supported by a government subsidy and profits and losses have been generally shared among all mines. However, on Oct. 1, a new government plan was expected to take effect. It calls for a sharp cutback in subsidies, a reorganization of the industry and abandonment of the price-sup-

Why Not Tell Us, Too?

MANY COAL-MINING COMPANIES make it a point to write us of personnel changes on their staff for inclusion in COAL AGE'S "Personal Notes" section, as well as other news of their company, such as new mine developments, safety and production achievements, annual staff functions, etc., accompanied by pictures where suitable and available. They know that friends, business acquaintances and employees all enjoy reading such news in COAL AGE. You, too, are invited to write us whenever the occasion arises—it takes only a minute. Job changes from the individuals concerned also are welcome. Address: News Editor, COAL AGE, 330 West 42nd St., New York 18, N. Y.

Foreign Developments



AUSTRALIA—The Power & Traction Finance Co., London, has given up its option for development of the

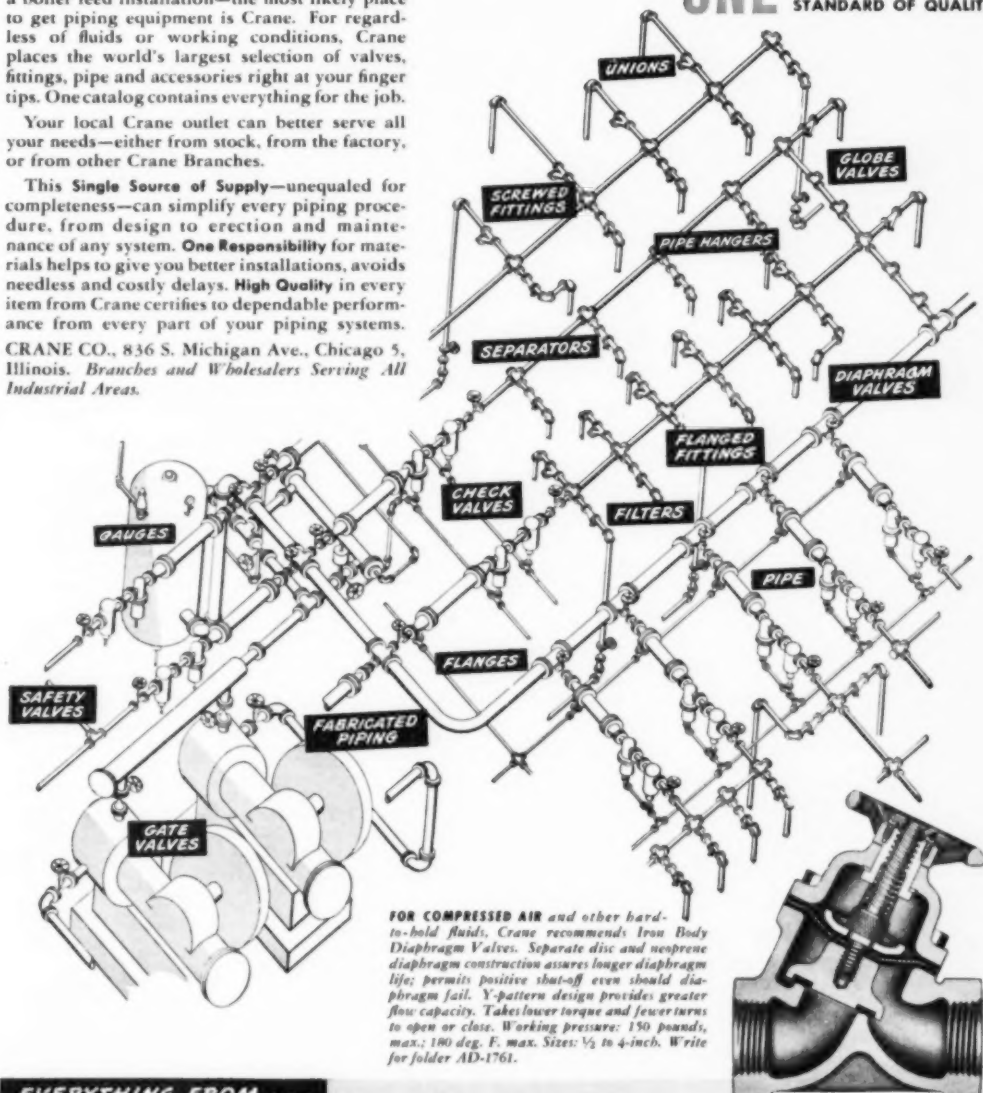
Why buy piping the hard way When CRANE supplies everything?

For Air Service Piping—as for a superheater or a boiler feed installation—the most likely place to get piping equipment is Crane. For regardless of fluids or working conditions, Crane places the world's largest selection of valves, fittings, pipe and accessories right at your finger tips. One catalog contains everything for the job.

Your local Crane outlet can better serve all your needs—either from stock, from the factory, or from other Crane Branches.

This **Single Source of Supply**—unequal for completeness—can simplify every piping procedure, from design to erection and maintenance of any system. **One Responsibility** for materials helps to give you better installations, avoids needless and costly delays. **High Quality** in every item from Crane certifies to dependable performance from every part of your piping systems. CRANE CO., 836 S. Michigan Ave., Chicago 5, Illinois. Branches and Wholesalers Serving All Industrial Areas.

ONE SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY



FOR COMPRESSED AIR and other hard-to-hold fluids, Crane recommends Iron Body Diaphragm Valves. Separate disc and neoprene diaphragm construction assures longer diaphragm life; permits positive shut-off even should diaphragm fail. Y-pattern design provides greater flow capacity. Takes lower torque and fewer turns to open or close. Working pressure: 150 pounds, max.; 180 deg. F. max. Sizes: 1/2 to 4-inch. Write for folder AD-1761.

EVERYTHING FROM . . .

VALVES • FITTINGS
PIPE • PLUMBING
AND HEATING

CRANE

FOR EVERY PIPING SYSTEM

port system which kept submarginal mines in operation.

CHINA—Communist controls and restrictions have created a crisis in the Kailan Mining Administration, Chinese-British operators of the Kailan coal mines. These mines, north of Tientsin, have been the largest coal producers in China for decades. Since the Communists took over in November, 1948, the operators have accumulated a deficit of about \$12,000,000. Production now is at half of capacity, workers' pay is over two months in arrears and mine equipment has deteriorated. Under the Communist administration, the operators are forced to sell their coal to a trading company at a fixed price far below production costs. Also, they must buy their timbers from Communist Manchuria at three times the cost of Japanese timbers, which they used prior to the Communist regime.

Pond Creek-Tug River Group Holds Safety Day

Top honors in the first aid contest in the Safety Day Meet sponsored by the Pond Creek-Tug River Mining Institute at Stone, Ky., Sept. 17, were taken by the team from Pond Creek Colliery, before the largest crowd attending in recent years, estimated at more than 1,400. At the end of the contest, teams from Pond Creek Colliery and the New Alma Coal Co. were tied for first place and in an overtime period the Pond Creek Colliery team defeated last year's winning team by a slim margin in a hard-fought contest. Placing third in the competition was the team from the Majestic Collieries, with a score only two discount points below that of the tying teams.

In the mine rescue contest held in the morning, Mine No. 7 team of the Eastern Coal Corp. won out over Mine No. 8 team of the same company, which won last year's contest. The team representing the Leckie Collieries Co., 1948 state champions in the colored division, placed first in the first-aid competition, with two colored teams participating. While there were no contests in the boys' division, the Pond Creek Colliery Boy Scout team, winner of the state-wide contest last year, put on a fine demonstration of its training.

As a result of the Safety Day Meet, the Institute was to be represented in the 1949 state-wide competition at Middlesboro, Ky., Oct. 22, by the first and second teams in the first aid contest, the winners in the mine rescue and colored first aid competitions, and by the Boy Scout team.

In opening the Safety Day, R. C. Denny, general manager, Black Gold Coal Corp. and Emperor Coal Co., and president of the Institute, welcomed participants and visitors in a short address, in which he stressed the need for continued interest in first aid and mine rescue work and praised the

splendid cooperation between the member companies of the Institute, the UMWA and officials of the state and federal bureaus. Joseph J. Ardigo, secretary, Williamson Coal Operators' Association, expressed the desire of operators for a continued improvement in mine safety, by every means available.

Also addressing the group were A. D. Sisk, chief, Kentucky Department of Mines and Minerals; A. U. Miller, supervising engineer, U. S. Bureau of Mines, Mt. Hope, W. Va.; and Bruce M. Evans, president of the Pond Creek Collieries UMWA local, who spoke on behalf of the miners. Harry Gandy Jr., representing the National Coal Association, presented the National Coal's Trophy to the winning team.

Other guests and officials attending included: W. H. Tomlinson, engineer-in-charge, U. S. Bureau of Mines, Norton, Va.; James Westfield, who is to succeed Mr. Miller in charge of the Bureau's Mt. Hope office; W. H. Role, Kentucky Department of Mines and Minerals; J. H. Mosgrove, safety director, Big Sandy-Elkhorn Mining Institute; and other state and federal bureau and coal-company officials.

Preparation Facilities

Black Star Coal Corp., Harlan mine, Alva, Ky.—Contract closed with McNally-Pittsburg Mfg. Corp. for drying addition to cleaning plant now under construction to dry $\frac{1}{4}$ x0-in coal by Raymond flash-type dryer with necessary accessory conveyors; capacity, 60 tph.

Amherst Coal Co., Lundale, W. Va. Contract closed with McNally-Pittsburg Mfg. Corp. for McNally-Vissac dryer addition for $1\frac{1}{4}$ x $\frac{1}{4}$ -in coal; dryer complete with McNally-Reintjes furnace and attendant conveying equipment; capacity, 130 tph.

Bevier Coal Co., Bevier, Mo.—Contract closed with McNally-Pittsburg Mfg. Corp. for washer addition to present washing facilities to wash 6x1 $\frac{1}{2}$ -in coal, with provision for future washing of 8x1 $\frac{1}{2}$ -in coal, in one McNally-Norton automatic Mogul Washbox, together with conveying equipment; capacity, 400 tph.

Seminole Coal Corp., Lenzburg, Ill.—Contract closed with McNally-Pittsburg Mfg. Corp. for washer addition to increase capacity to 425 tph feed, washing 6x0-in coal in one McNally-Norton automatic washbox; addition complete with new water-clarification system, attendant structures and conveyors.

Key Coal Co., Astoria mine, Astoria, Ill.—Contract closed with McNally-Pittsburg Mfg. Corp. for one Mc-

Nally-Vissac dryer for $\frac{1}{4}$ -in x $\frac{1}{2}$ -mm coal, to be incorporated with revised present heat dryers; capacity, 75 tph.

Regie des Mines de la Sarre, Camp-hausen mine, Sarre, France—Contract closed with Nelson L. Davis Co. for complete Heavy Media coal-processing plant utilizing two No. 107 Davis Heavy Media processors and all component equipment for the rinsing and draining of both the float and sink products and for the reclamation of the ground magnetite, with processors to receive a maximum feed of 30x250-mm raw coal for a float-and-sink separation between the limits of 1.85 and 2.10 sp gr.

Houilleres du Nord et-du-Pas-de-Calais, Douai (Nord), France—Contract closed with Nelson L. Davis for complete Heavy Media coal-processing plant utilizing a No. 103 standardized packaged assembly consisting of a No. 103 Davis Heavy Media processor arranged to make float-and-sink separation of coal from rejects between the limits of 1.35 and 1.75 sp gr and all necessary component equipment and all engineering; capacity, any size coal between 5 and 200 mm at a raw-coal uniform feed rate of 100 metric tons per hour.

Scholarships Awarded

Four new scholarships, valued at \$740 a year for Kentucky residents and \$840 for out-of-state holders, recently were announced by University of Kentucky officials. The new awards, sponsored by the Blue Diamond Coal Co., Alexander Bonnyman, president, are granted on a competitive basis among employees of Blue Diamond or their sons and provide four years' training in the college of engineering. Winners were named by Mr. Bonnyman as follows: Ray Melton, Leatherwood, Ky.; Paul Standerfer, Blue Diamond, Ky.; Herbert Dugger, Kitts, Ky.; and Charles Gibson, Leona Mines, Va.

Other scholarships were announced as follows:

By Harlan Mining Institute—James R. Stuart, Loyal, Ky.; and Charles B. Ulery and Ray C. Harrison, Cumberland, Ky.

By Princess Elkhorn Coal Co.—Jesse Lee Wright and Paul Hall, Prestonsburg, Ky.

By Inland Steel Co.—Marvin C. Fraley, Wayland, Ky. and Paulette Martin, Allen, Ky.

By Consolidation Coal Co. (Ky.), for special training in coal preparation (a \$2,500 grant)—D. T. Pritchard, Hazard, Ky., and B. M. Grimm, Hershey, Pa.

Scholarships renewed were as follows: Harlan Mining Institute—Lawrence Stewart, Loyal, Ky.; Princess Elkhorn—J. E. Vaughn, Prestonsburg, Ky., and Bee Johnson, Risner, Ky.; Inland Steel Co.—Robert L. Vines, Belfry, Ky.

Facts you should know

about the New General Motors Diesel Engine-Torque Converter Unit



Two 190 H.P. 6-Cylinder GM Diesel Engine-Torque Converter units power the new 34-ton Euclid 1-FFD tandem axle rear-dump. Each engine drives one rear axle, eliminating the conventional side-axle power divider. A 3-speed Allison Torqmatic transmission does away with the clutch pedal and manual shifting. Designed for off-the-highway haulage of large tonnage, the mammoth 1-FFD has a top speed of 25.4 m.p.h. with full pay load.

ONE MANUFACTURER ONE RESPONSIBILITY The new torque converter is specifically designed and manufactured by General Motors as an integral unit with the Series 71 two-cycle Diesel engine. Result: a big saving in size and weight—no compromise designs—no divided responsibility.

AUTOMATIC SHIFT FROM TORQUE MULTIPLICATION TO FLUID COUPLING Desirable features and advantages of both torque converter and fluid coupling are combined in this converter. Continuous automatic transition from 3.6-to-1 torque ratio at stall speed to 1-to-1 torque ratio in fluid coupling. Unit goes into fluid coupling whenever load requirements equal engine torque, without regard to output shaft speed.

MORE WORK IN LESS TIME This new power unit gets the most work done in the least time. Because it is not rigidly geared to the load, the engine responds to the throttle and immediately accelerates to a high output range regardless of the speed of the load.

FREEDOM FROM SHOCK LOADS Transmission of power through a liquid, cushions both engine and

driven machinery from sudden shock loads. Operation is liquid-smooth (free from jerks) at any speed or throttle setting.

FREEDOM FROM STALLS WITH OVERLOAD Fluid circuit prevents engine stalling under any load condition. Ability to exert a smooth pull at any output shaft speed down to zero permits GM Converter-equipped machines to do some operations that are impossible with conventional units.

EASE OF HANDLING Eliminates time lost in unnecessary low gear operation. Operator fatigue is reduced. Work is speeded up with less effort on the part of the operator.

WIDE RANGE OF MODELS The new GM Diesel Engine-Torque Converter unit is made available in 3-, 4- and 6-cylinder single engine units, Twin 4 and Twin 6 multiple engine units with engine ratings from 64 to 294 B.H.P. to meet a wide range of power requirements. Write or wire for full details.

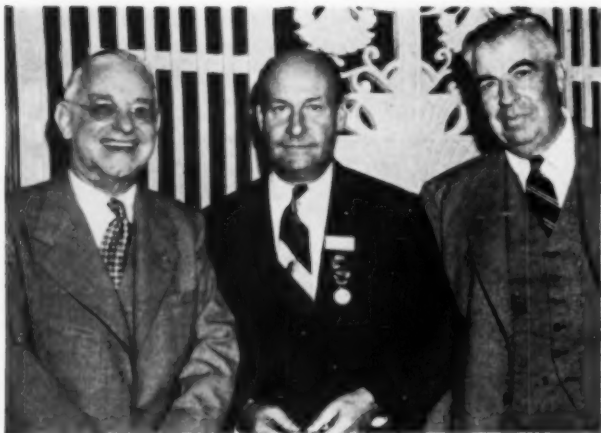
DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES... Up to 200 H.P. DETROIT 28, MICHIGAN MULTIPLE UNITS... Up to 800 H.P.

GENERAL MOTORS

DIESEL BRAVN WITHOUT THE BULK





NEW NCA OFFICERS—Treasurer, E. H. Davis (left), president, New York Coal Co., Columbus, Ohio; president, R. H. Knode, president, Stonega Coke & Coal Co., Philadelphia, Pa.; and vice president, W. C. Shank, president, Crowe Coal Co., St. Louis, Mo.



L. RUSSELL KELCE (left), president, Sinclair Coal Co., new member of the executive committee; and **Hugh B. Lee**, vice president, The Maumee Collieries Co., one of three new directors.

NCA Marks Year's Progress

Public Relations, Merchandising and Research Highlight Annual Meeting — Competing Fuels, Labor Upheavals and Federal Controls the Big Threats Ahead — Atom-Made Electric Power Scanned — New Officers Named

REPORTS ON ADVANCES marked up in the past year by Bituminous Coal Institute, Bituminous Coal Research, Inc., and Coal Heating Service, a look into the future of atom-

produced electric power and warnings of spreading government controls took the spotlight at the annual meeting of the National Coal Association in New York City, October 5-7. Approx-

mately 600 coal-industry leaders and others registered at the convention.

Ralph H. Knode, president, Stonega Coke & Coal Co., Philadelphia, Pa., and former NCA treasurer, was elected president succeeding Charles A. Owen, president, Imperial Coal Corporation, New York City. W. C. Shank, president, Crowe Coal Co., St. Louis, Mo., was named a new vice president and E. H. Davis, president, New York Coal Co., Columbus, Ohio, was made treasurer succeeding Mr. Knode. Three new directors were elected as follows: Hugh B. Lee, vice



RETIRING NCA PRESIDENT Charles A. Owen (left), president, Imperial Coal Corp.; Henry C. Woods, chairman, Vocational Training and Educational Committee, and board chairman, Sahara Coal Co.; L. C. Campbell, chairman, Safety Committee, and vice president, Eastern Gas & Fuel Associates; and B. R. Gebhart, chairman, Marketing Committee, and vice president, C. W. & F. Coal Co.





J. NELSON STUART, manager, Coal Mining Service Division—"Increasing concentration on better service to those who heat with coal" resulting from the program.



JOHN D. BATTLE, NCA executive vice president—"I have an abiding faith in the good sense of the American people if they know the truth" about our way of life.



J. W. HALEY, NCA secretary and general counsel—"Little chance of tax reduction next year or any other year for a long time to come" with such government deficits.

president, The Maumee Collieries Co., Terre Haute, Ind.; W. M. Osborne, president, Youghiogheny & Ohio Coal Co., Cleveland, Ohio; and D. W. Buchanan, Jr., vice president, Old Ben Coal Corp., Chicago, Ill. All other officers were re-elected.

Reviewing advances made in the past year and warning of obstacles ahead, Charles A. Owen, NCA president and president, Imperial Coal Corp., made the first of a series of officers' reports at the opening session Wednesday afternoon. H. B.

Baird, vice president, Coal Division, Eastern Gas & Fuel Associates, New York City, presided at the session after a call to order by P. F. Masse, convention-committee chairman and vice president, C. H. Sprague & Son Co., New York City.

With a newly-launched series of regional meetings, better bulletin service and an increasing program of research, education and public relations, the association has moved forward in the past year, Mr. Owen said. Because of its stronger position, it is

getting a better hearing in its opposition to such government proposals as the Missouri Valley Authority and the St. Lawrence Seaway, as well as its stand on the Taft-Hartley Act and the federal mine-safety bill. Speaking of the last item, Mr. Owen voiced the industry's pride in an improving safety record, stating that 1948 showed the lowest incidence of fatalities and injuries in history and that the first eight months of 1949 showed still further progress.

The big threat to coal is the trend

The Bituminous Work Stoppage

Statement by President C. A. Owen at the closing session of the National Coal Association meeting, Oct. 7, 1949.

The coal industry's objectives are to furnish the coal-consuming public a regular supply of coal at reasonable and competitive prices. To do this it must have a good, well-trained and satisfied labor force as well as an efficient and competent management to plan and direct its operation and labor. It must have safe mines and working conditions, equipped with modern mechanical coal-extracting facilities. It must be in a position to make full use of this equipment in which it has invested so many millions of dollars. It has to do this to be competitive with other fuels and still pay high wages to the miners and sustain the other costs to which the industry is subjected.

This industry seeks arrangements with its employees that will

permit uninterrupted operation of the mines so that users can be provided with the coal they want, when they want it and at a reasonable price. What the public wants and what the coal operators want are the same.

These objectives cannot be attained as long as the coercive labor monopoly which has dictated to this industry for so many years remains unchallenged.

People naturally expect some word from this gathering about the conditions that are now keeping idle most of the bituminous coal mines of this country. Nor can this convention of the National Coal Association, representing as it does all elements of the bituminous coal-mining industry, adjourn without public reference to a subject that

is so important to every one of us and to the people of this country...

We here, from whatever section of the industry we may come, are united in our belief that the present strike is a gross injustice on the industry, on its employees and on the public.

No one who has any sense of responsibility in the coal industry wishes production to be constantly harassed by strikes, stoppages, memorial holidays, three-day weeks and no-day weeks. There is no reasonable basis for these bedevilements. Coal miners are better off in wages and earnings (when the union permits them to work), better off in hours of work, better off in so-called welfare payments contributed by the employers than any industrial workers in the U. S.



FIRST AID TEAMS IN ACTION at the Kanawha Valley Mining Institute included this team from the Electro-Metallurgical Co., Alloy, W. Va., which tied for second place with the team representing the Sament-Solvay Division, Longacre, W. Va. Team members are G. C. Simmons (left), Clark Naylor, A. T. Stapleton, T. C. Proffitt, Walter Bailes, C. B. Smith, patient, and E. L. Batten (not shown), substitute.

Kanawha Safety Meet Draws 12,000 Spectators

The Carbon Fuel Co.'s first aid team took first place in the white division and the Elkridge team, Eastern Gas & Fuel Associates, took first place in the Negro division as the Kanawha Valley Mining Institute held its 18th annual safety meet Sept. 17 at Montgomery, W. Va. The day-long celebration featured, besides the first-aid contests, a 19-float parade with eight high-school bands, beauty contests, store-window displays and an address by Arch J. Alexander, chief, West Virginia Department of Mines. Over 12,000 people crowded into the town to see and take part in the meet.

First-aid teams of Eastern Gas & Fuel Associates took four prizes in the contest. Besides the Elkridge team's first place in the Negro division, the Powellton team took fourth place in the white division; the Elk-

ridge team, fifth place in the white division; and the Powellton team, second place in the Negro division. Other winners were: second and third places, white division a tie between Electro-Metallurgical Co., Alloy, and Sament-Solvay Co., Longacre; third place, Negro division, Carbon Fuel Co., Jochlin; first place, boys' section, Sament-Solvay Co.; second place, boys' section, Hatfield-Campbell Creek Coal Co., Rensford; first place and only entry, girls' section, Hatfield-Campbell Creek Coal Co.

First-place winners in white and Negro divisions won \$50 for each member of the team; second and third-place \$22.50 each; fourth place, \$15 each; fifth place, \$10 each. First-place winners in the boys' and girls' division won \$20 each; second place, \$10 each.

to competing fuels, helped along by oil imports totaling 400,000 to 500,000 bbl per day and by unsettled labor relations, Mr. Owens declared. However, he concluded, "When world affairs become more stabilized, many of our difficulties will disappear and the industry will experience a fair measure of prosperity."

Following a report by R. H. Knode, NCA treasurer and president, Stonega Coke & Coal Corp., Philadelphia, that the association has a comfortable working capital to tide it over any predictable emergency, John D. Battle, NCA executive vice president, warned that spreading government bureaucracy threatens still further controls on business and industry. "If there is an exception to the efforts to regulate and control, that exception is that

the federal government has not proposed to bring labor unions under the same laws that are designed to govern business groups generally," he pointed out.

Listing some of the projects now before Congress or soon to be introduced, Mr. Battle cited moves to fix production quotas and prices and empower the government to build and operate factories, set up more free social and health services, write health and safety rules for all industry, provide for enforceable federal mine inspections and control coal output and fix prices. As further threats to coal, he cited wider use of diesel locomotives, expansion of natural-gas pipelines and continuing competition from fuel oil.

However, Mr. Battle noted that

some advances have been made in the past year; namely, improvement in the industry's safety record, growth of vocational training and education to draw young men to the industry and the increasing willingness of industry leaders to testify before congressional committees. Looking ahead, he urged coal men to take a more positive stand in the election of legislators and to find ways of keeping their employees informed about free competitive capitalism. "I have an abiding faith in the good sense of the American people if they know the truth," he said.

Exports of some 6,000,000 tons annually to European countries were predicted by John S. Routh, president, Coal Exporters Association of the United States, Inc., and president, Routh Coal Corp., New York City. Labor upheavals in 1949 and the dollar shortage in Europe were responsible in some measure for the decline in exports, Mr. Routh said. With the shrinkage of high-grade coal reserves in Britain, the only sources to which Europe can look for coal to run coke and gas plants are the United States and the Ruhr. American coal, in spite of the long overseas haul, still is cheaper to many importing countries than European coal. Exports to Japan probably will run the total annual tonnage of exports up to 7,000,000 tons at the end of June, 1950, Mr. Routh concluded.

An adequate supply of hopper and gondola cars in the past year was reported by Laurence Tierney Jr., chairman, Interstate & Foreign Commerce Committee, and president, Eastern Coal Corp., Bluefield, W. Va. Mr. Tierney's report was made by Vernon Fritchman, vice president, Rochester & Pittsburgh Coal Co., Indiana, Pa. An adequate supply of coal cars is likely to continue because production and consumption of coal are down from 1948 and because the drop in exports and increasing competition from oil and natural gas are cutting into coal output. An additional factor is that the railroads now have some 24,000 more hopper and gondola cars than in 1948, Mr. Tierney pointed out. Citing the year's increases in freight rates, he predicted that there would be no cutback in rates or transportation taxes in the next several years.

"Your committee will not stand for singling out coal alone as an air contaminant and it will not stand for the hysterical approach," declared R. L. Ireland Jr., chairman, NCA air purification committee, and president, Hanna Coal Co., Cleveland, Ohio. Mr. Ireland noted that the committee is integrating its program with that of Coal Heating Service and that it is insisting on "intelligent action involving engineering equipment, research and education" in its program to combat air pollution. The committee recently has become a co-sponsor of the Smoke Prevention Association of America in promoting National Smoke

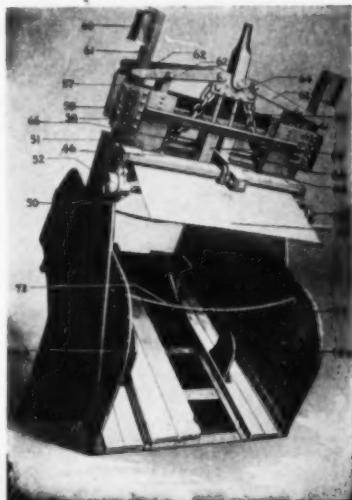
(Continued on page 160)

Lepley MINE EQUIPMENT

COST REDUCING

For nearly 80 years we have pioneered in the construction of equipment designed to stand up under the hardest kind of service—and low enough in original cost to keep overhead and depreciation within reasonable limits.

On this page is just a sample of the operating equipment we supply. Other items available: Steam or Electric Hoists and Haulages, Self Dumping Safety Cages, Bottom Discharge, Skips, Overturning Skips, Overturning Cage (End Dump), Solid Car Side Dump Cage, Bottom Loading Skips, Hard Steel Liner Head Sheaves, Shaft Bearings, Rotary Dumps, Mine Fans, Mine Pumps, Revolving Slate Dump Ladders, Rectangular and Beehive Coke Oven Machinery, Fort-Pitt Mine Equipment and allied equipment.



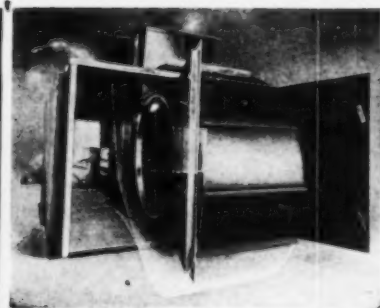
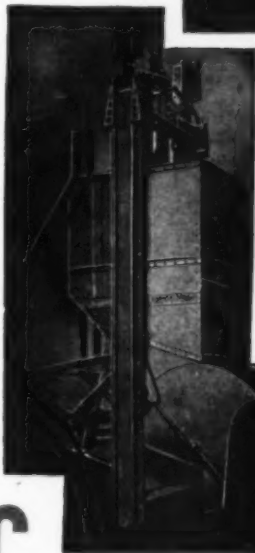
We have no "standard" hoist line — each design is based on a study of your needs. Steam and electric shaft and slope hoists available.

H O I S T S



CAGES

Simplicity, ruggedness, safety and low maintenance are stressed in the design of Lepley Cages—your answer for efficient handling.



F A N S

Reversible supply or exhaust fans to suit your mine. Sizes up to 35 ft. in dia. by 8 ft. face. Produces 700,000 cu. ft. min. at 10.3 inches water gauge.

S K I P S

Leading coal mining companies testify—Lepley Skips meet rugged requirements at lowest cost . . . tops for efficient material handling.

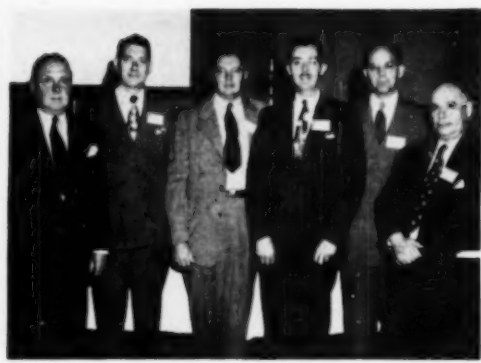
Write—ASK FOR
DESCRIPTIVE
BULLETINS

SEND US YOUR PROBLEMS

CONNELLVILLE MFG. & MINE SUPPLY CO. CONNELLVILLE PENNA.



ROOF BOLTING AND POWER FOR CONTINUOUS MINING—Lee Siniff (left), Consolidation Coal Co. (Ky.); J. R. Guard, Rochester & Pittsburgh Coal Co.; Edward Thomas and H. P. Greenwald, U. S. Bureau of Mines; Max H. Forester, Pittsburgh Consolidation Coal Co.; and John Raves, Pittsburgh Coal Co.



AIR POLLUTION—T. C. Wurts (left), County of Allegheny, Pennsylvania; Carl E. Miller, Battelle Memorial Institute; Carroll F. Hardy, Appalachian Coals, Inc.; Elmer R. Kaiser, Bituminous Coal Research, Inc.; L. C. McCabe, U. S. Bureau of Mines; Henry F. Hebley, Pittsburgh Consolidation Coal Co.



COAL GEOLOGY AND SYNTHETIC FUELS—John H. Melvin (seated, left), Geological Survey of Ohio; E. R. Price, Inland Steel Co., and Coal Division chairman; and Elmer R. Kaiser, Bituminous Coal Research; Norman K. Flint (standing, left), Geological Survey of Ohio; William Crenz, U. S. Bureau of Mines; and Gilbert H. Cady, Illinois Geological Survey.



CONTINUOUS MINING—J. W. Woomer (seated, left), consulting engineer; and Stephen Krickovic, Eastern Gas & Fuel Associates; J. A. Russell (standing, left), Dominion Steel & Coal Corp.; W. B. Jamison, Jamison Coal & Coke Co.; Gerald von Stroh, Bituminous Coal Research Mining Development Committee; and Clifford H. Snyder, Sunnyside Coal Corp.

AIME Stages Midyear Meeting

Roof Bolting, Continuous Mining, Coal Geology and Synthetic Fuels and Air Pollution Featured in Coal Division Technical Sessions — Forum Offers Advice to Students and Junior Engineers

SYMPOSIUMS on roof bolting and continuous miners drew top interest of coal mining men at the AIME mid-year meeting held in Columbus, Ohio, Sept. 25-29. Although the discussions

indicated widespread adoptions of roof bolting, a failure of the method was reported from Pennsylvania. Among the other subjects featured in the technical sessions of the Coal Division

were power supply for continuous miners, coal geology, coal preparation for synthetic-liquid fuels, engineering graduate problems and air pollution.

Dr. L. E. Young, president of the institute, was toastmaster at the annual midyear banquet, at which Dr. Joseph W. Barker, president, Research Corp., the guest speaker, discussed "Creative Research and the Mineral Industries." E. H. Davis, president, New York Coal Sales Co., acted as toastmaster at an all-institute luncheon and speakers included Gov. Frank J. Lausche of Ohio. E. R. Price, chair-



STUDENT-ADVISORY FORUM—M. D. Cooper (seated, left), NCA; C. E. Lawall, C. & O. Ry.; E. R. Price, Inland Steel Co.; and Clyde E. Williams, Battelle Memorial Institute; Howard Gaw (standing, left), Armco Steel Corp.; Gerrard C. Gamba, Pittsburgh Consolidation Coal Co.; C. E. Sales, Ironton Fire Brick Co.; James D. Reilly, Hanna Coal Co.; A. R. Anderson, Jeffrey Mfg. Co.; and C. V. Millikan, Amerada Petroleum Corp. AIME inspection group (right) touring mines of the Hanna Coal Co. pose inside the new 50 cu yd bucket recently installed on a shovel at Georgetown No. 12, with D. Saxton, mine superintendent, at the right.

man of the Coal Division, AIME, presided at a luncheon held in connection with a business meeting of the division.

Acting as co-chairman for the four technical sessions of the Coal Division were: Roof Bolting and Power for Continuous Mining—Max H. Forester, Pittsburgh Consolidation Coal Co., and H. P. Greenwald, U. S. Bureau of Mines; Continuous Mining—J. W. Woerner, consulting engineer, and Stephen Krickovic, Eastern Gas & Fuel Associates; Coal Geology and Synthetic Fuels—John H. Melvin, Geological Survey of Ohio, and E. R. Price, Inland Steel Co.; and Air Pollution—Carroll F. Hardy, Appalachian Coals, Inc., and Elmer R. Kaiser, Bituminous Coal Research, Inc.

The last day was devoted to inspection trips, one group visiting the plant of the Jeffrey Mfg. Co. and the other touring mines of the Hanna Coal Co. The latter group entered Willow Grove mine via the elevator at the new man portal and was taken in man-trip cars over the underground haul to the main haulage portal and washing plant. The final stop was at the company's Georgetown No. 12 strip mine to see the 50-cu yd bucket recently installed on a Marion 5561 shovel. This machine, including about 400 tons of ballast, has a working weight of approximately 2,000 tons and can handle approximately 1,000,000 cu yd per month.

An estimated 25 linear miles of underground passageways have been roof bolted in the last few months, reported Edward Thomas, mining engineer in charge, roof bolt section, U. S. Bureau of Mines, in his paper, "Latest Developments in Roof Bolting."

The following conclusion quoted from the paper sums up the present attitude of the Bureau: "Suspension roof support offers the mining industry an efficient and inherently safe method of roof support. The method

has an extensive range of application under widely different roof conditions and opens the possibility for developing new and more efficient mining methods. Many questions regarding the theory and application of this type of support cannot be answered as yet except by 'cut-and-try' methods. With present knowledge it is not a 'cure-all' for all types of roof conditions, nor can one be certain that a method which is successful in one mine will be effective and safe in another mine without careful study and closely supervised experimentation under controlled conditions."

Mr. Thomas said that approximately 95% of the rods used are the split-rod-and-wedge type. Recovery of rods is not advocated and will not be until procedures and techniques are developed that prove absolutely safe. Companies adopting roof bolting should make sure that adequate compressor capacity for stoper drills is provided so that the work will not be interrupted by lack of adequate equipment. Two experiments of limited scope in Pennsylvania indicate that roof bolting may prove advantageous on pillar lines. Several companies are about to make large-scale experiments with combinations of roof bolts and breaker posts.

In the Elkhorn No. 3 seam, Jenkins, Ky., the Consolidation Coal Co. (Ky.) has installed 44,000 roof bolts with excellent results, according to Lee D. Siniff, mechanical and electrical engineer, in his paper on Consol's experience. While most of the bolts were the split-rod-and-wedge type, 1 in diameter, with 1x1/2x6-in wedge, the company has installed 1,000 Ohio Brass special expansion shells with 3/4-in bolts. Not having to drive a bolt over a wedge has been found a distinct advantage from the standpoint of additional equipment necessary, where bolt holes can be drilled with an auger.

Experimental bolts installed in the

fall of 1948 are still holding a section of passageway although crossbar-timbered adjacent sections have fallen. In an area where great trouble was encountered in holding the roof in 18-ft rooms with 5x7-in wood crossbars, roof bolting alone is successfully holding a 40-ft experimental room. Bolted roofs proved so secure that the men were very soon in favor of leaving out timbers and trusting to bolts alone, thus gaining in travel height and eliminating accidents from knocking out posts formerly experienced. Bolt holes now are drilled by an electric auger drill mounted on the boom of a timbering machine. A pilot model of a new-type roof-drilling machine is soon to be put into use, but the perfected unit is probably many months away. While bolts are installed on 4-ft centers each way, it has not been determined that this is proper spacing.

Failures of 1-in by 4-ft split-rod-and-wedge bolts to hold the laminated roof above the 97-in Thick Freeport seam in Renton No. 6 mines, Pittsburgh Coal Co., 15 mi east of Pittsburgh, were described by John Raves, superintendent, in his paper. Bolting was begun in April, 1949, and 80 ft of bolted top from which timbers had been removed fell July 10. This was later followed by other falls of bolted top. Although steel bearing plates were used and the nuts tightened by an impact wrench, insufficient tying of the strata is indicated. The company now is experimenting with a different type of anchorage.

Richard Maize, Pennsylvania Secretary of Mines, stated that he has issued orders discontinuing experimenting with roof bolts in Pennsylvania until the department has made further studies of the method and has set up minimum standards. It was understood that he meant experimentation with roof bolts alone, without first erecting the standard timbering.

S. D. Gunning, chief engineer, Cleve-



"Men in White" Add Eye Appeal to Coal Delivery

IN A STEP designed to sell customers on the fact that coal delivery need not be a dirty job, delivery men of the Champion Coal Co., Pittsburgh, Pa., have been outfitted with white uniforms that typify the cleanliness of the coal they are delivering. Obtained on a rental basis from a local industrial launderer, the uniforms consist of a heavy overall and jacket for winter wear and a lightweight shirt and trouser combination for summer. The garments have the company's emblem and the Coal Heating Service emblem on the front pockets and the company name on the back as illus-

trated. Two changes a week have been found sufficient to maintain a neat appearance and the men have taken more interest in both their personal appearance and that of the company equipment as a result, according to reports. Delays in delivery also have been reduced, it is said, because housewives seem to be more inclined to let the uniformed drivers in. There are more than 100 launderers equipped to provide a similar service, according to the Institute of Industrial Launderers, Inc., 45 Tudor City Place, New York 17, who will supply additional information on request.

land Division, Le Roi Co., confessed to being a roof-bolt enthusiast and said he thinks that it never will be possible to set up a standard for all mines, but rather that bolt length and spacing must be developed for each individual mine.

Ac power is indicated as the ultimate solution to the power requirements of continuous-mining machines but that is not yet possible because of the Pennsylvania law requiring burying of high-voltage cables, said J. R. Guard, electrical and maintenance engineer, Rochester & Pittsburgh Coal Co., in his paper, "Promises for AC Power Economies with New Mining Machines." Use of ac requires that the transformers be kept close to the face and it would not be practical to bury 4,000-v feed cables that would soon have to be taken up to keep pace with mining progress. Its use must wait development of some method of haulage to displace the dc shuttle car and a change of the state laws to permit a suitable method of installing high-voltage cables serving face machinery.

Based on the R. & P.'s experience, Mr. Guard said, a Joy continuous miner takes a peak of 150 kw, a 15-sec peak of 115 kw and an average of 105 kw, which, with the shuttle cars

and spray pump, requires 150 kw of substation capacity. Two units constitute a load for a 300-kw substation, and therefore the power supply can be handled separately from the trolley system supplying locomotives. The law requiring burying of high-voltage cables makes it difficult to keep dc substations located close enough to the face.

Among the advantages of ac power cited by Mr. Guard were: (1) a substation cost of \$7,000, as compared to \$20,000 to \$30,000 for dc; (2) 10% higher efficiency of conversion; (3) ac motors and controls much less subject to troubles than dc; (4) source of ac power in a mine more reliable than dc because it is separate from haulage circuits and because transformers are less subject to trouble than dc conversion equipment; (5) ac motors and starters cost considerably less than dc; and (6) most ac motors can be started across the line, thus eliminating starter cost and maintenance.

The strong arguments for dc are: (1) it is probably already in the mine and available; and (2) dc motors will operate if necessary on lower than standard voltage, thus permitting completion of a mining section without additional investment for better power.

J. A. Russell, chief mechanical engineer, Dominion Steel & Coal Corp., Canada, reported that his company supplies 500-v ac power to a longwall continuous miner of the Joy cutter-head type with two 250-kva transformers kept within 500 ft of the face. The company recently installed its first 100-hp diesel locomotive underground, thus working toward complete elimination of dc power. The difficulty of starting long belts with squirrel-cage motors was solved by installing hydraulic couplings.

Gerald von Stroh, BCR Mining Development Committee, in his paper, "The Analysis for a Continuous Mining Machine," reported that within a day or two after the meeting the first test in coal was to be made on a continuous-mining-machine unit of new design and that a full-scale underground test of a stainless-steel belt was already under way. Using slides, he described the early developments of continuous mining, beginning with an 1870 design. In addition to the two machines now on the market, Mr. von Stroh said, two more types will be available within a year or so and four more are under consideration. Static tests on coals, a preliminary step in the research program, are now about 50% completed. Among the specifications decided upon for continuous-miner development are that it must work in coal as low as 28 in, produce 2 tons per minute and weigh not over 25 tons.

The Sunnyhill-Jeffrey Colmol, incorporating several improvements over the original Colmol, will be in full production in 8 to 12 months, according to Clifford H. Snyder, president, Sunnyhill Coal Co., who presented a paper discussing that unit. More than \$1,000,000 has been spent to date in developing this continuous miner, he reported. Models will include a 300-hp low-type unit, with a cutting height of 30 to 42 in (and up to 61 in by a unit change) and three 50-hp motors; and a 800-hp high-type machine, featuring a cutting height of 80 to 120 in and three 135-hp motors.

Machine parts are designed on a unit basis for easy replacement of any one. Tractor-tread slippage experienced with the original experimental machine has been solved by bit design. A tendency to climb has been rectified by a relocation of the machine's center of weight. Four hydraulic jacks have been added so that the level of the machine can be quickly adjusted to follow rolls of the seam.

Using projection slides, Mr. Snyder illustrated several methods of driving 14-ft entries with the Colmol, including offset straight cuts and alternate angle cuts. He showed the use of a short turnbuckle jack with a pin on one end and a saddle on the other to hold crossbars by angling the short jack from the end of the timber into the rib. In answer to a question, Mr. Snyder said that one Colmol is now in regular operation at Masontown, W. Va., and that one would go into

Whether your stripping operation takes
BIG blasts or small

"Nitramon" offers you these 3 All-Important Benefits



EFFICIENCY—The big blast pictured (left) at a Kentucky bituminous strip mine took 124,000 pounds of "Nitramon." There were 97 vertical holes averaging 75 feet in depth, and these were loaded immediately after drilling. The same practice can be followed in preparing blasts of any size. Because "Nitramon" is safe and easy to handle, it simplifies loading and speeds up the job. And as "Nitramon" is packed in watertight metal cans, long exposure to wet weather is no problem.

ECONOMY—"Nitramon," properly loaded, completely shatters overburden, as result of this big blast at right shows. Secondary blasting is reduced. Overburden is easily, quickly removed. Dragline and shoveling costs are held low, and there's minimum delay in uncovering the coal.



SAFETY—"Nitramon" is safe to store... safe to handle... safe to load. It is insensitive to friction, falling objects or sudden shock... cannot be detonated with commercial blasting caps or even by open flame. A "Nitramon" Primer, however—itself relatively insensitive—is used with "Primacord" to detonate large or small charges. But no caps come on the job until time of firing.

TODAY... if you're blasting strip mines... make a point of asking the Du Pont Explosives representative in your area for detailed information about "Nitramon," the safest blasting agent. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

* Reg. Trade Mark for nitrocarbohydrazide blasting agent

DU PONT "NITRAMON"

Blasting Supplies and Accessories



"Nitramon" is another product
of DuPont Explosives Research

"Nitramon" is not an explosive in the accepted sense of the word, since it cannot be detonated by: (1) the strongest of commercial blasting caps; (2) "Primacord"; (3) flame; or (4) the impact of ball ammunition or heavy steel weights. Its full blasting strength is developed by the use of a suitable primer.

Other important advantages are: (1) packed in sealed metal containers so water resistance is unlimited, provided cans are properly handled and loaded; (2) non-headache-producing due to the nature of the package and the absence of nitroglycerin; (3) absolutely non-freezing; and (4) appreciable savings to the user.

JUST OUT!

NEW EDITION BLASTERS' HANDBOOK

470 pages of up-to-the-minute information every blaster can use. Outlines accepted methods, contains new charts... new tables... and an officially approved check list of safety measures. Shows best ways of preparing, priming, loading and blasting charges in all kinds of work. Send for your copy now... \$1.50 postpaid.



Listen to "Cavalcade of America"—
Tuesday Evenings—NBC



BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY

For Maximum Safety, Dependability

in Mine Roof Support

always specify

DUFF-NORTON MINE ROOF JACKS

Duff-Norton Mine Roof Jacks . . . jack fittings . . . angle jacks and pin timbering jacks are your best choice for all mine roof supporting jobs. Their sturdy construction combines safety and dependability with economy. To specify the right jacks for your needs . . .

Write today for your copy of this Handy Guide for selecting all types of Mine Jacks.

Visit our Booth 1554,
American Mining Congress
May 9-12, 1949.

See your Local Distributor



THE DUFF-NORTON MANUFACTURING CO.

MAIN PLANT and GENERAL OFFICES, PITTSBURGH 30, PA. — CANADIAN PLANT, TORONTO, ONT.

"The House that Jacks Built"

operation in Oklahoma within a few days.

Voltage difficulties in supplying power to a high-type Joy continuous miner operating in the Pittsburgh seam in northern West Virginia were surmounted by adopting the Edison three-wire system (*Coal Age*, July, 1943, p 65) and using a three-wire No. 0 trailing cable, said W. B. Jamison, chief engineer, Jamison Coal & Coke Co., in a paper detailing his company's experience with the continuous miner.

The newer machine has overcome several mechanical difficulties encountered with the first model. Cutter-chain breakage appears to be the most difficult. Brakes have been installed on the treads to maintain the sump at its rated 18 in. instead of letting it fall short to an average of about 14 in.

In development work in No. 9 mine, using one shuttle car as a storage bin and two or three shuttle cars for haulage, the performance over a long experimental period with the continuous miner has ranged from nothing to 75 tons per man-day. Size consist is not much different than with conventional mining and the percentage of $\frac{3}{4}$ -in x 0 slick is about the same. Voltage and hydraulic pressure have considerable effect on size consist. Moderate success has been attained in allaying dust with sprays.

Longwall mining with a continuous-type machine built by the user under Joy patents and put into service in May, 1949, was described and illustrated by J. A. Russell, chief mechanical engineer, Dominion Steel & Coal Corp., Canada, in his paper. The unit, which is a short model without swinging head, has a short cross-conveyor instead of a tail conveyor and takes a 4½-ft cut as it progresses along the face, discharging to a chain face conveyor. When the machine is turned around to make the return trip, the cross-conveyor is reversed and its position on the machine changed to discharge to the opposite side. The machine is powered with 500 volts ac. By old methods, long walls, usually 500 ft, produced 500 tons in 24 hr with 102 men. It is expected that with the continuous miner daily production from a wall can be brought up to 1,000 tons with 94 men.

On a moisture-free basis, U. S. Bureau of Mines synthetic-liquid-fuels tests on Rock Springs (Wyo.) coal at an assumed delivered cost of \$6 per ton indicate that 11.4¢ per ton can be spent in cleaning for each 1% reduction in ash content, according to a paper by W. L. Crentz, J. D. Doherty and E. E. Donath and presented by Mr. Crentz. Ash reduction is of prime importance in the Bergius coal-hydrogenation process. In the other process, gas synthesis, reduction of sulphur assumes great importance but with most American coals there is not much reduction in sulphur until the washing gravity is lowered to about 1.30.

Impact of an expanding synthetic liquid fuels program on the coal in-

WITH ALL THEIR **EXTRA VALUE...**



DODGE

"Job-Rated" TRUCKS
are priced with the lowest!

It's what you get for what you pay that counts!

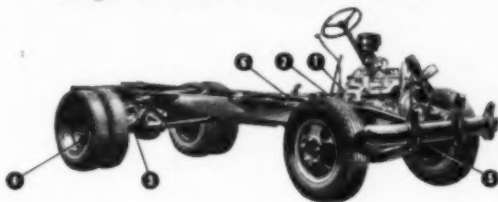
Read, on this page, why Dodge "Job-Rated" trucks offer you extra value.

Then, see your Dodge dealer. Ask him to quote you the price of the Dodge "Job-Rated" truck that fits your hauling or delivery job.

You'll get more for your money . . . in performance, in economy, in long-lasting truck satisfaction.

See your Dodge dealer *now*.

Dodge "Job-Rated" Chassis Features



1. SUPER-FRICTION CLUTCHES. Large frictional areas. "Job-Rated" for smooth action and long life.

2. RUGGED 3-, 4- or 5-SPEED SYNCHRO-SHIFT TRANSMISSIONS — "Job-Rated" for the load. Carburized gears; heat-treated shafts; antifriction bearings throughout.

3. FULL-FLOATING REAR AXLES . . . Hypoid design; banjo-type housing . . . "Job-Rated" for the load. Long life . . . low upkeep cost.

4. CYCLEBONDED BRAKE LININGS (no rivets) prolong brake life.

5. CROSS-TYPE STEERING . . . Sharp turning angle; easier handling, and parking.

6. SAFETY-LOCATED GAS TANKS . . . Outside the cab, NOT inside!

NEW STEERING COLUMN GEARSHIFT . . . Standard equipment on $\frac{1}{2}$ -, $\frac{3}{4}$ - and 1-ton models with 3-speed transmissions . . . provides easier handling, more unobstructed floor space, greater safety of operation.

"RIGHT-SPOT" HAND BRAKE . . . under the center of the cowl . . . right where you want it. Standard on all $\frac{1}{2}$ -, $\frac{3}{4}$ - and 1-ton models. Provides unobstructed floor space; easier passage through either cab door.

Dodge "Job-Rated" Engine Features!

• **FAMOUS DODGE L-HEAD TRUCK ENGINES** . . . "Job-Rated" for your loads; save gas, oil.

• **COMPLETELY SPLASH- AND DUST-PROOF ELECTRICAL SYSTEM** . . . with high-output generator. Resistor-type spark plugs, and high-output coil, insure amazingly smooth engine operation; longer plug life.

• **EXHAUST VALVE SEAT INSERTS** . . . resist wear and pitting. Reduce valve grinding; preserve performance.

• **REPLACEABLE PREFITTED MAIN BEARINGS** . . . precision, long-life quality. Reduce maintenance costs.

• **FULL-PRESSURE LUBRICATION** . . . positive pressure to main, connecting rod and camshaft bearings and camshaft drive, prolongs engine life.

• **FULL-LENGTH CYLINDER COOLING** . . . 4-RING ALUMINUM ALLOY PISTONS . . . OIL-BATH AIR CLEANER and many other money-saving features!

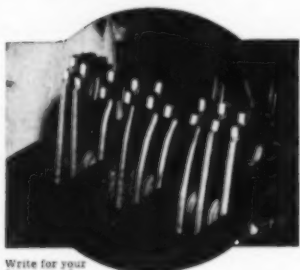
For the good of your business...

switch to DODGE
"Job-Rated" TRUCKS

FOR HARD FACING AND REPAIR

Amsco® WELDING PRODUCTS

TUNGSITE Tungsten Carbide INSERTS



Write for your
free copy of
"Hard Surfacing
by Fusion
Welding."

FOUR WEEKS—instead of only four days—now that these hammers are tipped with Amsco Tungsite Inserts! Imagine how this 600% longer hammer life, with its reduction in machine repair and down time, has cut the costs of pulverizing asphalt roofing trimmings.

Amsco Tungsten Carbide welding products are available as Inserts . . . or as Tungrod and Tube Tungsite hardfacing rods and electrodes. To meet all job needs . . . Inserts are available in a wide range of shapes and sizes . . . and Tungrod and Tube Tungsite are supplied in a variety of mesh sizes. Recommended for resistance to extreme abrasion, or when a serrated cutting edge is required. Outstandingly successful on rotary drill bits, plowshares, cane knives, muller plows, pug mill knives, hammer-mill hammers and similar parts.

Brake Shoes

AMERICAN MANGANESE
STEEL DIVISION

409 E. 14th St., Chicago Heights, Illinois
Offices in Principal Cities

dustry was indicated by a statement that supplying half of the present-day petroleum needs would require 500,000,000 tons annually.

Mining can continue for 315 years in Perry County, Ohio, if it continues at the average rate of the past 75 years (1,600,000 tons per year) and recovery is 60%, concluded Norman K. Flint, Geological Survey of Ohio, in a paper on a recent study of coal reserves in that county. At the 1948 production rate, however, the mining could continue for only 135 years.

Perry County, 50 miles southeast of Columbus, is the fourth largest county in coal production in the state. The major portion of recoverable coals is above drainage, with the greatest depth about 150 ft. Replying to a question, Mr. Flint estimated that about 75% of the reserves is 2 ft or more in thickness.

A proposal that coal geologists and chemists join in coal research was made by Gilbert H. Cady, Illinois Geological Survey, who presented a paper on "Research in Coal Geology." Research will assume greater importance as the best coal resources become exhausted and mining must turn to the less preferable seams. Studies have indicated a definite relation between fusain content in midwestern coals and the quantity of dust made by those coals. In answer to a question, Dr. Cady said that if a state is to set up a coal research program at least five or six trained men have to be hired and he pointed out that there is a shortage of such men because it is only recently that schools have installed courses in the subject. Three institutions offer such courses.

A bulletin showing liquid-fuel yields of Ohio coals will soon be published, said W. H. Smith, Geological Survey of Ohio, in a paper on "Synthetic Liquid Fuels Studies in Ohio." Some cannel coals have shown high yields of 40 to 50 gal per ton. Ohio also has tremendous deposits of oil shales but the yield generally is seldom over 2 gal per ton, which rules them out at present. There are, however, many shaley coals and many coaly shales that yield about half as much as good coals. Five seams in Ohio can enter materially into a synthetic-fuels program but all require cleaning. Research is centering on the high-ash high-sulphur No. 19 seam in which there has been little mining development.

Yields from the best shales of the state were given by C. A. Bowen, Engineering Experiment Station, Ohio State University, who also discussed the same subject. Samples from drill holes in the vicinity of Chillicothe showed 5 to 10 gal per ton. Development of Ohio oil shales would require very large plants and would involve large disposal problems, Mr. Bowen said.

A number of mining engineering students from Ohio State University were present at a Forum on Problems of Students and Junior Engineers, at which C. E. Lawall, vice president,

FOR EASIER- FASTER Drilling

THE
McCARTHY
VERTICAL
DRILL



For record-breaking performance . . . for ease of operation, you can't top a McCarthy Vertical Drill. Recently, on one difficult job, workers using McCarthy equipment drilled an 8-inch hole 100 feet deep in only 40 minutes! The derrick is raised and lowered by hydraulic power . . . finger tip controlled . . . and a 60 H. P. gasoline motor is part of the standard equipment.

The McCarthy Vertical Drill, manufactured by The Salem Tool Co., is adaptable to high wall and key way drilling and diamond drill boring . . . drills 90% of all limestone and sand rock formations, and readily burrows through shale. Send today for complete information, and for a free copy of The Salem Tool Company booklet.

MINING EQUIPMENT
SINCE 1901



THE SALEM TOOL COMPANY

Two South Main Street
SALEM, OHIO, U. S. A.



GIVING BELTS THE HOTFOOT ... FOR A LONGER LIFE

QUAKER CONVEYOR BELTS PRE-TESTED 18 TIMES TO ASSURE LONG LIFE UNDER MOST SEVERE CONDITIONS

Coal . . . rock . . . slag—all kinds, sizes and shapes and case histories prove Quaker Belts stand up under the most severe usage. They're pre-tested and torture-tested when they are made to withstand every operating condition.

One of the many tests Quaker Conveyor Belts must go through is shown above. A blowtorch, at high heat, held six inches from the surface of the belt for six minutes. Quaker Belts take it and are ready for more. They're tough, rugged and built for longer wear. They're made for the coal industry to assure less maintenance . . . to save loss of labor in repairs . . . to help your mine reduce the "break-even point" in its operations.

Whatever your need for industrial rubber products there's a Quaker Pre-tested Product for the Coal Industry. Power transmission belting for every type of installation . . . rod and sheet packings . . . moulded and braided hose . . . and all kinds of custom-made moulded rubber products. To economize . . . it pays to Quakerize your mine.

HOSE THAT STANDS ABRASION



All types of hose for water, air or steam . . . underground or above ground. Every length of Quaker hose is scientifically pre-tested to withstand proper pressures and extreme wear.

BELTING FOR MAXIMUM HORSEPOWER

Whether it is a heavy duty conveyor hauling coal "out" or a V-belt for fractional horsepower drives in the tipple, Quaker has the belt to fit the need . . . to step up the efficiency.



QUAKER RUBBER CORPORATION

PHILADELPHIA 24, PA. • New York 7 • Cleveland 15 • Chicago 16 • Houston 1
Western Territory
QUAKER PACIFIC RUBBER CO. • San Francisco 10 • Los Angeles 21 • Seattle 4

Q U A K E R

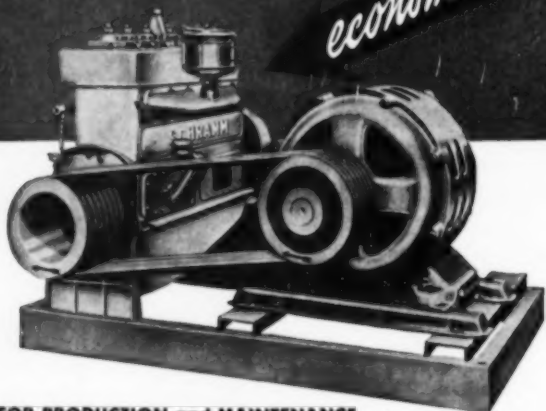
RUBBER PRODUCTS



REG. U. S. PAT. OFF.

MORE AIR

economically!



• FOR PRODUCTION and MAINTENANCE • FOR SPEEDY PNEUMATIC TOOLS

SCHRAMM INC. offers a complete line of Industrial Compressors in sizes ranging from . . . 2 to 600 cubic feet displacement . . . Built and designed for continuous heavy duty service with a minimum of attention. Available in "V" or Flat Belt Drive . . . on base for belt drive from motor or engine . . . or, with direct motor drive. No special foundation required . . . can be bolted to any substantial floor.

Where running water is not available the SCHRAMM Cooling Unit will prove adequate under severest conditions. Accessories essential to any modern industrial installation can also be provided.

Write for Bulletin #4910.

Important Features

Compact... Easy To Install
Mechanical Intake Valve
Force Feed Lubrication
100% Water Cooled
Electric Push Button Starting
En Bloc Construction
Easy Accessibility
Vibrationless
Wear Bearing Surface

SCHRAMM INC.

THE COMPRESSOR
PEOPLE
•
WEST CHESTER
PENNSYLVANIA

C. & O. Ry. acted as moderator. Scheduled talks were made by eight student advisors, with many other comments offered from the floor. The eight advisors were: A. R. Anderson, Jeffrey Mfg. Co.; C. E. Bales, Ironton Fire Brick Co.; M. D. Cooper, National Coal Association; Gerrard C. Gams, Pittsburgh Consolidation Coal Co.; C. V. Millikan, Amerada Petroleum Corp.; James A. Reilly, vice president, Hanna Coal Co.; Harold Gaw, Armco Steel Corp. and Clyde E. Williams, Battelle Memorial Institute.

In selecting a young engineer, the willingness to really work was accorded first importance among the several qualifications set forth by Mr. Reilly. Two other speakers expressed the same opinion. J. H. Fulford, general manager of sales, mining division, Jeffrey Mfg. Co., said that graduates going into sales have to work just as hard and get salaries no larger than in the operating end. Henry C. Woods, chairman of the board, Sahara Coal Co., urged coal operators to give students summer jobs so that they can secure their papers earlier. Graduates should have better command of English so they can express themselves properly to the boss, Mr. Woods said.

The general practice by which only about the upper one-third of a class have a chance to be interviewed by companies seeking new graduates was given an airing. Several men pointed to the fact that the remaining group often includes students who will go to the top in industry and that lack of high scholarship may result from a student working his way through school or taking part in broadening activities that the top-mark student perhaps misses.

Dr. Young pointed out that lawyers may be 7 years in training and doctors 11 years, so that the engineering graduate of a 4-year course should consider himself in training for several more years. On the question as to whether a graduate should seek employment with a large or small company, Mr. Reilly recommended the latter. Mr. Greenwald mentioned that while a large company has a training organization assuring steady progress, the new man may possibly get experience faster with a smaller company.

Air pollution from coal burning is no longer the primary problem in Pittsburgh and Philadelphia, it was brought out in a symposium devoted to air pollution. In the Pittsburgh area, according to a paper presented by Thomas C. Wurts, director, Bureau of Smoke Control, Allegheny County, switch locomotives are now 80% dieselized and soon will be 100%. A committee has begun work on the elimination of cinder throwing by main-line locomotives.

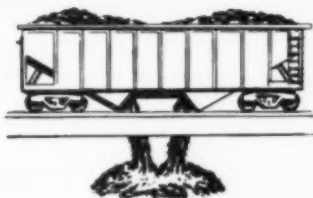
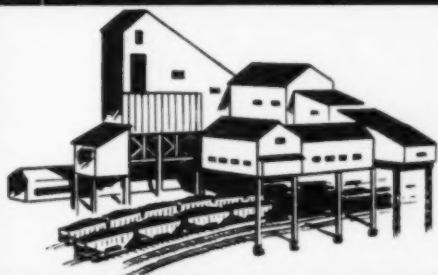
Gas problems of air pollution will not be vigorously attacked until the solids problems have been licked. Elimination of all smoke from domestic chimneys is several steps down the

How You Can **SPEED UP** WINTER HANDLING OF COAL

● Economical **STERLING ROCK SALT** Can Help You Speed Up Cold Weather Operations All Along the Line

AT THE MINES

● An unexcelled anti-freeze around the mines, Sterling Rock Salt removes treacherous snow and ice, eliminates costly delays, helps prevent accidents, and saves labor during freezing weather. It costs only about half as much as other, less effective, chemicals, yet it is more efficient, and melts more ice. Sterling Rock Salt is easy to handle, stores well, and is harmless to coal and harmless to the hands and clothing of workers.



IN THE CARS

● Your customers will gladly pay the small premium for coal treated with Sterling Rock Salt at the mines. Rock Salt prevents freezing of coal in transit. The cost is repaid many times over by the elimination of the delay and expense in thawing cars of frozen coal. Men and equipment are freed for delivery of coal to users!

HOW TO USE STERLING ROCK SALT

For Anthracite Coal—First dump the required amount of Sterling Rock Salt—5 to 8 pounds per ton of coal—on loading platforms. Your regular car loaders then spread a light application of the salt over hopper doors in empty cars. Wet coal feeds from loading chutes, workers rhythmically shovel the rest of the salt onto the coal for even distribution. More salt is readied as the runner places the next car.

For Bituminous Coal—Usually loaded dry into cars, bituminous coal generally needs but 5 pounds of Sterling Rock Salt per ton of coal. The best

method is to apply about a quarter of the salt around the doors and bottom of each car, and distribute the rest uniformly through the coal as it is loaded from the chutes.

For De-icing Hoppers at the Colliery—All cars received at the colliery coated or partially filled with snow or ice should be cleaned out thoroughly before loading. About 75 pounds of Sterling Rock Salt should be spread over the hopper doors and car floor. The ice and snow will either run out completely as brine, or be in such a state that the hopper can be opened and the ice jarred out.

Order **STERLING ROCK SALT** Now!

IN CARLOADS, BULK, OR HANDY 100-LB. BAGS

INTERNATIONAL SALT COMPANY, INC.

Scranton, Pa.

"Sure, I'd wear a respirator . . .

. . . if it was comfortable!"



Respirator Style 45D

Respirators must fit properly and provide ease of breathing before workers stop risking their lungs—and your profits.

Protection must be combined with comfort. One without the other means a wasted investment in safety equipment. Here is a WILLSON lightweight respirator, approved by the U. S. Bureau of Mines for use in dusts and mists. It has gained wide acceptance in industry through workers' willingness to wear it. Normal breathing is assured through easily replaceable filters and a positive acting exhaust valve. The facepiece, in two sizes with adjustable wire nose spring and adjustable elastic headband, is adaptable to all face sizes.



NEW CATALOG

In addition to product information, it contains information on safety glass, filter glass, respiratory hazards, etc., which will help you select proper safety equipment to meet specific hazards. Send for it!



WILLSON PRODUCTS, INC., 239 WASHINGTON STREET, READING, PENNA.



list. In the 700 sq mi of Allegheny County, 50,000,000 tons of bituminous coal are used yearly. Eighteen gob piles are burning in the county. The five or six Bessemer converters present an outstanding problem and the 132 open-hearth furnaces in the county also require action, Mr. Wurts said.

L. C. McCabe, U. S. Bureau of Mines, formerly in charge of ridding Los Angeles County, Calif., of air pollution, said that it was easy to get rid of smoke. Dust from industries, particularly from metallurgical plants, constitutes the real problem, he maintained in his paper, "Air Pollution by Industrial Fumes, Gases and Dusts."

In discussion, W. C. L. Hemeon, Industrial Hygiene Foundation, stated that the problems of eliminating coal smoke are no longer technical. Instead, the problem is the approach. Both individuals and industries favor cleaning up the atmosphere. For eliminating domestic smoke, he suggested further outlawing of high-volatile coals, encouraging low-volatile coals and low-temperature coking and effecting wholesale replacement of old stoves and other outmoded heating equipment.

Henry F. Hebley, Pittsburgh Consolidation Coal Co., presented on the stage a laboratory demonstration showing how a tiny percentage of SO₂ in the air will cause a fog in a valley when temperature inversions and pressure changes take place. Air in a glass jug slightly contaminated by burning a match but still clear developed a dense fog the moment the pressure was dropped. Clean air showed no fog on the same pressure drop. Height of chimneys is now being determined largely by meteorological conditions rather than by the demands of draft only.

As an indication of progress, Carl E. Miller, Battelle Memorial Institute, reported that public utilities have spent 60 to 80 million dollars to collect fly ash although they burn only about 20% of the coal.

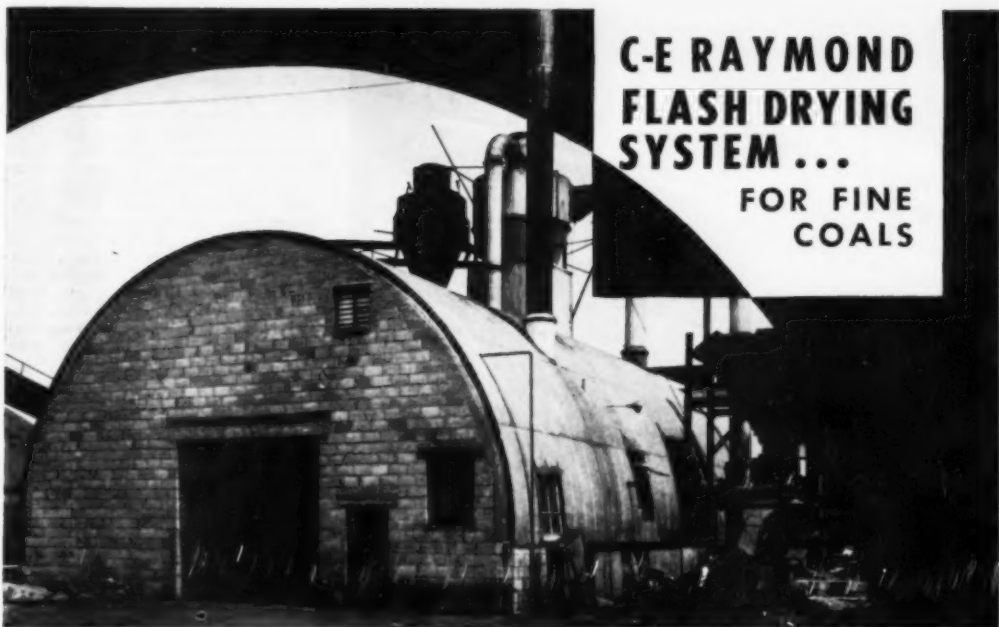
National Coal Association

(Continued from p. 148)

Abatement Week, Mr. Ireland announced.

"The big question about Bituminous Coal Institute is not how much is being spent but how well it is being spent," declared Fred S. McConnell, BCI president and president, Enos Coal Mining Co., Cleveland, Ohio. Mr. McConnell was lead-off speaker at the Thursday morning session, D. A. Thomas, president, Boothton Coal Mining Co., Boothton, Ala., presiding.

With an informed public as its objective, BCI is living well within its budget and is face-to-face with many opportunities to improve public opinion of coal, Mr. McConnell reported. The basis of good public relations for coal is the industry itself and the men



C-E RAYMOND FLASH DRYING SYSTEM ...

FOR FINE
COALS

ECONOMICALLY ADAPTABLE to SMALL and LARGE PLANTS

The flexibility of the C-E Raymond Flash Drying System makes it readily applicable to any size installation, or to any plant arrangement. The equipment may be designed to provide for capacities from around 7 tons an hour up to 175 tons, or more, of dried coal.

A complete unit with a single drying column will give a range of 10 to 75 tons per hour. In addition, several columns may be connected with a single furnace for still higher capacities.

This type of equipment will handle initial surface moisture up to 12% without circulation. By using recirculation, there is no upper limit to the initial moisture which can be handled, and 25% to 30% is a common requirement. The final moisture content is readily varied to suit conditions. It will range from 0% to 3% in most installations.

If you are producing fine coal sizes between $\frac{3}{4}$ " x 0", you can obtain maximum efficiency and economy with the C-E Raymond Flash Drying System, regardless of the size of your plant.

Kuesel Coal Company, Milwaukee, Wis., is getting excellent results with a C-E Raymond Flash Drying System, designed for a plant capacity of 15 tons per hour of fine coal.



In writing for information, please state your capacity requirements. This Bulletin will be sent to you on request.



COMBUSTION ENGINEERING-SUPERHEATER, INC.

FLASH DRYER DIVISION, 1315 North Branch St., Chicago 22, Illinois

ROOF SUSPENSION BOLTS



WEDGE TYPE

STUD EXPANSION
SLEEVE TYPE

BOLT EXPANSION
SLEEVE TYPE

SAFE ECONOMICAL

Increase safety and cut costs by holding your roof with West Virginia Roof Suspension Bolts. Easy to install, require no maintenance and eliminate timbering. Result is a passageway clear from wall to wall, floor to roof, providing less resistance to the flow of ventilating air, enabling loading machines to clean up a cut from rib to rib without interference from timber or timber legs. West Virginia Roof Bolts can be used singly at selected points or in sets of three or four with steel channel. Available in lengths from 2 to 8 feet, in types as illustrated. Use flat washers for vertical installations, or West Virginia Universal Angle washers for angular installations.

The new West Virginia universal angle washer is especially designed for use with West Virginia roof suspension bolts. The washer is adaptable for installations at angles between 45 and 60°. Within these limits, no matter what the angle, the nut bears fully on the washer. West Virginia universal angle washers may be used against either crossbars or the roof itself.

Write for descriptive literature and information on application of roof bolting to your particular problem.

Manufacturers of
RAILS AND ACCESSORIES
TRACK WORK
STEEL TIES

**West Virginia
Steel & Manufacturing Co.**
Huntington, West Virginia

who run it. That is why NCA must continue to encourage those activities and policies that make for good public relations, he urged.

BCI's program is both short-range and long-range, said Ralph Mulligan, director of public relations, BCI. The short-range program is carried to the present generation by press and radio contacts, news service, magazine articles and national advertising. The long-range program, aimed at youngsters, is carried forward in work with school teachers and students and with authors and publishers of text books. Reviewing steps taken in the past year to get the facts to the public, he cited the following: (1) half a million copies of a quiz book, "Old King Coal Calls a New Tune"; (2) 25,000 copies monthly of a pamphlet, "Pertinent Facts About Coal"; (3) 500,000 copies of a 16-page picture book, "A Down-to-Earth Picture of Coal"; (4) a sequel picture book now in preparation; (5) completion of *Coal Facts Annual*, 1949 edition; (6) exhibits at industrial shows and professional meetings; (7) broadcast of a daily radio news program, "Congress Today"; (8) distribution of a radio transcription of an interview with Dan Harrington, former chief, Health & Safety Branch, U. S. Bureau of Mines; (9) advertising in national magazines, the industrial press and teachers' publications; and (10) promoting the work of the NCA Safety Division, the vocational education program, the Land Use Committee, Coal Heating Service, Bituminous Coal Research and the Committee on Air Purification. Mr. Mulligan invited attention to a display of related photographs titled "Coal at Work in the Heart of America," picturing the various uses of coal in Muncie, Ind.

For the year ahead—the fifth season for BCI's Speakers' Bureau—80 speaking engagements already have been booked in 20 states, reported James Cunningham, director of the bureau. Last year, 320 programs were presented on a wide range of topics—coal-mining methods, coal as an energy supplier, technical advances in the industry, coal and atomic power, air purification and conservation of natural resources. "The Magic of Coal," an 18-min sound film of which 80 prints have been sold or placed on permanent loan, now shows about 400 bookings a month, not to mention 38 television showings in recent months. A new film, "Underground Adventure," is expected to match these figures shortly. Explaining how the bureau works, Mr. Cunningham stressed the need for more volunteers among coal producers and sales executives and urged that top company officials name some of their salesmen to take speaking assignments.

With 32,000,000 people in the education business, it is important that the truth about the coal industry be told in schools and colleges, declared Dr. M. Edmund Speare, educational director, BCI. Besides marked suc-

cess with book and textbook publishers and authors in correcting errors about coal and the correction of 34 articles in magazines and encyclopedias, the educational department in the past year has received 50,000 requests from teachers for educational materials and has given away 957,000 teaching aids. Also, exhibits have been shown at teacher conventions totaling over 100,000 delegates and strip-slide films, recently produced, have been distributed, along with teachers' guides, educational pamphlets and laminated photographs showing coal mining and uses. Symposiums also have been prepared for women's clubs on natural resources and air purification.

"Everyone in this room has the same opportunity, in varying degree, to be a public relations man for coal," declared Clarence Goshorn, president, Benton & Bowles, Inc., New York City, who addressed the convention on "The Value of Advertising." A great deal of advertising is not geared to sell a product but to sell an idea—to explain to the general public the service an industry or an association performs, he explained, citing examples of the success of so-called institutional advertising in creating favorable public opinion. BCI messages have a circulation of 11,000,000 to 12,000,000. To carry these messages, BCI spends about one-fifth of its advertising funds for space in 21 publications read only by teachers, 11 coal-industry papers and magazines, and five publications directed at news reporters, editors and radio commentators. The remainder of BCI's advertising funds goes to general-circulation magazines, the selection of media being based on a careful analysis of reader groups for widest possible coverage.

Summing up, Mr. Goshorn pointed out that for every dollar BCI spends in magazines, its advertisements attract 150 readers. Later, when interviewed, two-thirds of these 150 people can recall one or more of the ideas in the advertising. Altogether, reaching 12,000,000 families by advertising costs the coal industry only about 1¢ per head.

In an open forum following the BCI program, four coal men spoke as follows:

H. C. Woods, chairman of the board, Sahara Coal Co., Chicago—Public speaking does a public-relations job that advertising cannot do. For that reason, there is need for wider support among industry leaders for the BCI Speakers' Bureau. As an illustration of how public relations gets results, some high-school youngsters in Illinois, instead of making the usual trip to Washington in the spring, chose to visit a Sahara Coal Co. mine, where they were taken underground, boys and girls alike.

R. E. Jamison, president, Jamison Coal & Coke Co., Greensburg, Pa.—The educational program, headed by Dr. Speare, is doing an indispensable long-range job.

M. L. Patton, vice president, Truax-



VORTRAP

For Centrifugal Separation of Solids from Liquids

- ☆ Over 10 years experience in paper industry removing grit and foreign particles from paper stock.
- ☆ Many successful applications on pigments and slurries for removing grit—sand—or oversize particles.
- ☆ Solids removed in large quantities from coal wash waters.
- ☆ Various sizes of Vortraps lend flexibility in handling Large or Small Volumes.

Write for Bulletin No. 211-A

NICHOLS Engineering & Research Corp.

70 Pine Street - New York 5, N. Y.

40 S. Las Robles Ave., Pasadena, Calif.
1477 Sherbrooke St. W., Montreal 25, Canada

STOP UNLOADING WORRIES

Freezeproof your coal with

**WYANDOTTE
CALCIUM
CHLORIDE**

Unloading coal is a worry when it's frozen in the car. Time and labor are wasted in cracking it. Railway cars are kept idle. Dealers can't meet delivery schedules.

You can easily save your dealers this expense and inconvenience. Freezeproof your coal with Wyandotte Calcium Chloride.

Coal treated with Wyandotte Calcium Chloride is readily handled at the yard—even in sub-zero weather. It comes out of the car the same grade as it went in—not battered, smashed or cracked. And no special equipment is needed to handle Wyandotte Calcium Chloride for freezeproofing.

The coupon will bring you full information about this safe, dependable and economical agent for treating coal.

WYANDOTTE CHEMICALS CORPORATION
Michigan Alkali Division
Wyandotte, Michigan

Send me literature and further information about the uses and advantages of Wyandotte Calcium Chloride.

Name _____

Address _____

Title _____



Wyandotte
REG. U. S. PAT. OFF.

CALCIUM CHLORIDE

WYANDOTTE CHEMICALS CORPORATION

MICHIGAN ALKALI DIVISION, Wyandotte, Michigan

Built for long service . . .

Shaker Conveyor Troughs and Ball Frames



The special high carbon steel of which Hendrick Shaker Conveyor Troughs are made, offers great resistance to abrasion and to bending or breaking under weight of the coal. The sides of the troughs are so shaped that they give maximum resistance to buckling.

Outstanding for accurate and uniform construction, Hendrick Conveyor Troughs are made in standard lengths of 10 feet, and 10 feet, 2 inches, but can be furnished in any desired length up to 13 feet, 2 inches.

Hendrick Ball Frames give troughs substantial support whatever the floor conditions. Write for full information.



Perforated Metals
Perforated Metal Screens
Wedge-Slot Screens
Mitco Open Steel Flooring
"Shur-Site" Treads and
Armorgrids

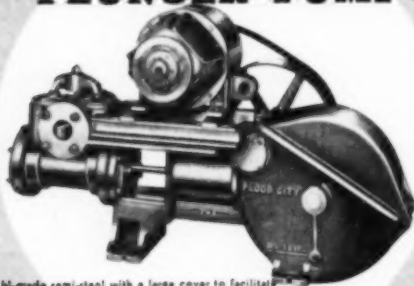
HENDRICK

Manufacturing Company

41 DUNDAFF STREET, CARBONDALE, PENNA.

Sales Offices In Principal Cities

CONTROL Your Water Problems with the *Flood City* PLUNGER PUMP



Power end is made of hi-grade semi-steel with a large cover to facilitate inspection. All moving parts are completely self-lubricating. Intermediate shaft runs on adjustable roller bearings. Furnished V-Belt or Gear Drive. Size 3 x 5, Capacity, 30 gals. per minute, 2" suction and 2" discharge.

This pump uses the leak-proof, acid-resistant FLOOD CITY REVERSIBLE WATER END—standard for replacement purposes in large and small coal mines. Write for more information on this and other Flood City Mining Equipment.

Flood City Brass & Electric Co.

Messenger and Elder Streets • JOHNSTOWN, PA.

Branch Office: 4 Virginia St. W., Charleston, W. Va.

Traer Coal Co., Chicago—Public relations is not a destination but an attitude. For success, the personal factor must be strong. BCI is a good guide along these lines.

B. R. Gebhart, vice president, Chicago, Wilmington & Franklin Coal Co., Chicago—The fact that almost an entire morning in a crowded program is given to BCI is a measure of the worth of good public relations. BCI is working closely with Coal Heating Service.

Since the formation of Competitive Fuels Research Association and, subsequently, the Fuels Research Council, Inc., a more favorable policy affecting coal and railroads has become noticeable in the Federal Power Commission, resulting in more thorough examination of the supplies of natural gas available to pipeline companies seeking authorization, said Tom J. McGrath, general counsel, Fuels Research Council, Inc., Cleveland, Ohio. More attention also is being directed to the proposed end uses of gas. Mr. McGrath reviewed recent decisions of the FPC based on failure of the applicants to show adequate supplies of gas and estimated that the NCA and its collaborators had intervened in some 40 dockets now pending before the commission.

Though Congress has made no taxation moves affecting the bituminous industry in the last year, it is likely to take steps to increase taxes in the year ahead, warned James W. Haley, secretary and general counsel, NCA. Mr. Haley spoke at the Wednesday afternoon meeting, with Harry Laviers, vice president and general manager, South-East Coal Co., Paintsville, Ky., presiding.

NCA representatives are prepared to appear before Congressional tax committees, if the occasion arises, in efforts to work changes in depletion rates, depreciation computations and definitions of net income and property and to eliminate the transportation tax and revise Section 102 of the Revenue Code, Mr. Haley said. Declaring that the condition of federal finances will determine any possible revisions in our tax system, he stressed the probability of administrative requests for higher personal and corporate income taxes and revival of the undistributed profits tax. On the whole, he stated, there is little chance of a tax reduction next year or for some time to come.

Devoting some discussion to proposed additional social-security taxes, Mr. Haley stressed the inequities imposed on the coal operators by a payroll tax and suggested two approaches to the problem: (1) placing a limit on the amount any employer will pay and (2) obtaining the needed revenues from other taxes. He urged also that the contributory principle be maintained in pension systems.

"The 1948 rate of 1.46 fatalities per million tons was the best in the history of bituminous coal mining and the record in 1949 is even brighter," said L. C. Campbell, chairman, safety

committee, and vice president, Eastern Gas & Fuel Associates, Pittsburgh, Pa. The NCA Safety Division, now a little less than a year old, has added its weight to the drive for safety by stimulating safety activities among NCA member companies, distributing safety literature, publications, payroll stuffers, posters, speeches and magazine articles and conferring with company safety engineers. In addition, the division voiced the industry's views on proposed legislation to give federal mine officials police powers. Turning to the bill itself, Mr. Campbell pointed out specific weaknesses and generalizations in the phrasing regarding minimum standards of timbering, construction and use of machinery and equipment, composition and use of explosives, mining methods, repairs and "other standards." The best way to make real progress in safety is to reach the individual worker, who is responsible for 80% of all injuries. To this end, the Safety Division has supported the safety-education work of the Bureau of Mines, state departments and individual companies. Mr. Campbell concluded his report by urging cooperation of NCA companies in the division's plan for a "No-Accident Month" scheduled for December, 1949.

Pointing out that retail dealers sell some 20% of annual bituminous production, B. R. Gebhart, chairman, NCA Marketing Committee, and vice president, Chicago, Wilmington & Franklin Coal Co., Chicago, stressed the need for still greater cooperation between producers and retailers through Coal Heating Service. In the three years since its beginning, CHS has grown to 73 groups totaling about 1,900 retailers and affiliates and serving some 300 cities and towns in 24 states. Mr. Gebhart stated. These groups sell about 17,500,000 tons per year and, with NCA contributions of some \$297,000 per year and local assessments of \$327,000, are spending nearly \$625,000 annually to promote the retail sale of coal. Direct NCA expenses in the past fiscal year for staff salaries, travel and operations totaled \$188,000, showing a downward trend as compared with prior years, Mr. Gebhart said.

The number of CHS groups in operation has grown 40% and the tonnage participating has increased 32% in the last year, said J. Nelson Stuart, manager, CHS Division. Over 50% of all group expenditures have been for advertising and for service and educational programs, with newspaper lineage totaling 1,266,351, he added. Summarizing group activities, Mr. Stuart listed advertising of coal dependability and the availability of 24-hour service, "clean, careful, courteous" deliveries, education in the need for furnace cleaning and conditioning, training of retailer and service personnel, improvement of sales methods through clinics and schools, stress on the merits of automatic coal heat, promotion of space heaters in coopera-

tion with furniture and hardware dealers, close working contact with architects, builders and mortgage-loan firms, liaison with the BCI Speakers' Bureau and regional meetings with groups of retailers and local CHS officials.

As for the year ahead, Mr. Stuart predicted that emphasis will be on cooperation with established CHS groups, leaving less time than before for organizing new groups. To help the work along, he urged shippers to authorize their sales representatives to support and promote CHS through coke and coal salesmen's clubs. Also, he asked that producers display the CHS "Sponsoring Member" insignia in their advertising and on their letterheads and invoices.

Many of the problems that worry producers worry retailers also, declared J. Atlee Schafer, president, American Retail Coal Association, and president and treasurer, Schafer-Suhr Coal Co., Cleveland. Glancing backward a quarter-century and more, to a time when coal held a virtual monopoly on the nation's fuel markets, Mr. Schafer declared that coal men were slow to realize that other fuels could steal their markets and therefore were unprepared for the increase in oil and natural-gas sales. Added to this, coal prices have risen until coal has lost its price advantage over gas and, with increasingly frequent mine stoppages, coal supplies now are not dependable. In the present strike, Mr. Schafer pointed out, retail stocks of coal are low in the Middle West, scarcely any coal is available in the Northwest and the supply of smokeless bituminous is so acute that a crisis may well occur in cities where smoke ordinances are in effect.

The result of inability to meet competition, short supplies and labor upheavals has been a growing loss of retail coal markets which, in the present crisis, may squeeze a good many small coal retailers out of business, thus reducing outlets for coal still further, Mr. Schafer warned. To improve coal's prospects, he urged (1) early development of better stoves and furnaces and bin-fed ash-removal stokers and their sale through retail coal dealers with promotional help from CHS, (2) efforts by producers to keep prices within reasonable bounds and (3) expansion of CHS and more regular interchange of ideas between retailers and the NCA Marketing Committee.

In an open-forum discussion following the report on CHS, C. R. Griffith, president, Southern Coal & Coke Co., Knoxville, Tenn., praised the progress made by CHS since its founding and urged continued and larger support for its activities. He pointed out, however, that repeated mining stoppages make the going rough for CHS.

"The CHS program must go forward," declared E. H. Davis, president, New York Coal Co., Columbus,

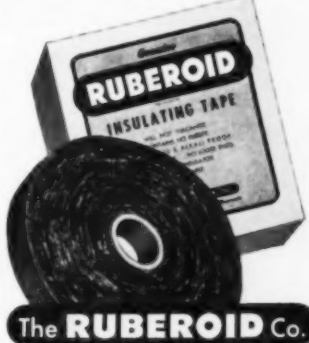


BETTER THESE 7 WAYS:

Don't waste maintenance dollars on costly, unnecessary cable wear! Protect with tough, waterproof

RUBEROID INSULATING TAPE

1. Double grip. Both sides adhesive.
2. Great tensile strength.
3. Won't tear, ravel or pucker.
4. Abrasion resistant.
5. Acid and alkali proof.
6. Extra thick; one layer insulates.
7. Exceeds A.S.T.M. specifications by 300% in adhesiveness . . . by 26% in tensile strength . . . by 290% in dielectric strength!

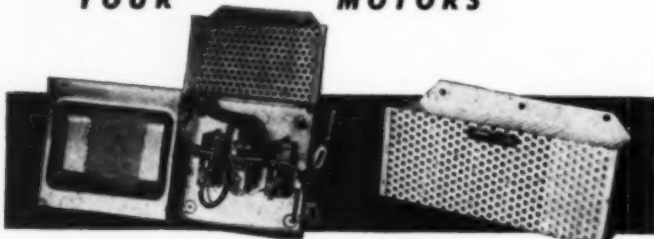


The **RUBEROID Co.**

QUALITY BUILDING MATERIALS
500 Fifth Avenue, New York 18, N. Y.

SMOOTH STARTS with GUYAN

**D. C. STARTERS
MEANS LONGER TROUBLE-FREE
SERVICE FROM
YOUR MOTORS**



GUYAN TYPE MMS MOTOR STARTER
Manually operated — automatically makes armature-to-line connection at proper speed to insure smooth starts after power disruptions. Solderless lug connections.

GUYAN TYPE CMS MOTOR STARTER
Limits initial inrush of current—permits smooth starts—prevents arcing. Requires no operator. Similar to type MMS except for omission of manually operated starting switch.

Write for bulletins

GUYAN MACHINERY CO. LOGAN, W. VA.

MORE HAULAGE FOR 20% LESS BATTERY CAPACITY

Oil-tight, non-lock transmission. Uses regular auto oil; change every 6 months.



Extra-long journal springs assure better trackability. Large motor, to assure more horsepower per ton weight of locomotive. Can be equipped with hydraulic brake.

GREENSBURG "RANGER"

This locomotive being used for main line haulage at the Blacksmith Coal Company, Newinger, Missouri. This is a 4½ ton locomotive, operating on 30" gauge track. This locomotive built from 3½ to 10 tons — either single or double motor-drive — 16" to 36½" track gauge.

All Greensburg Locomotives are CUSTOM-BUILT to your requirements

THE GREENSBURG MACHINE CO. 101 STANTON ST. GREENSBURG, PA.

SPEED PRODUCTION — DECREASE INJURIES

Tough, long wearing HORSE HIDE

Designed especially for handling block, brick, tile and similar materials, these G-S Hand-Mitts offer maximum wear and coal comfort at minimum cost. Workers like them. You will like the long wearing qualities of genuine horse hide.

Sample pair.....\$1.00 Dozen pairs.....\$11.40
Shoe accounts limited.

ORDER TODAY DIRECT FROM



2777 W. Huntingdon St. Philadelphia, Pa.
Ask about our complete line of leather, canvas and rubber coated gloves.



Ohio, who paid tribute to the achievements of the men who run CHS.

H. A. Glover, president, Island Creek Coal Sales Co., Huntington, W. Va., warned that operators must do more than produce and ship coal. With more and bigger problems now than ever before, the coal retailer must have help from producers and shippers. "The day of 'Let George do it' is gone forever," Mr. Glover declared, urging that shippers and producers direct their salesmen to take a more active part in promoting CHS and its program.

"CHS is filling a long-felt need in the industry and will grow with the years," predicted Paul L. Shields, president, Spring Canyon Coal Co., Salt Lake City, Utah.

E. H. Zimmerman, treasurer and sales manager, Imperial Coal Corp., New York City, pointed out that it is hard to adapt CHS methods to eastern retail markets but that ways are being sought to bring CHS to that area.

"What are the coal operators getting for their federal tax money and what kind of representation are they receiving from their senators and representatives?" was the big question raised by J. W. Haley, NCA secretary and general counsel. Mr. Haley spoke at the Friday morning session, with A. B. Stock, vice president (sales) Sinclair Coal Co., Kansas City, Mo., presiding.

After pointing out that coal producers do not exert the social, political or economic influence to which they are entitled, and urging that they make their views known directly to their congressmen, Mr. Haley reported on recent and pending legislation affecting coal and outlined briefly the structure, functions and powers of Congress. Laws passed by the Eighty-First Congress include the following: (1) extension of voluntary allocation agreements, which may possibly be invoked in the present crisis in steel and coal; (2) extension of export controls, which threatens free international trade if economic conditions change in the near future; (3) extension of rent controls, enabling owners of company housing to seek rent adjustments; (4) European Recovery Program, making dollars available for purchase of coal; and (5) overtime-on-overtime, which, though a move in the right direction, still needs clarification of "regular rate."

Pending legislation affecting coal Mr. Haley reported, includes the following: (1) labor, with the probability of no real showdown this year; (2) wage-and-hour, in which differences still exist between the House and Senate versions; (3) basing-point, which may affect the cost of materials and supplies but not coal itself; (4) industrial safety, including a proposal to empower federal mine inspectors to enforce safety rules; and (5) anti-trust and monopoly, which may bring labor organizations under the law.

Ten to 15 years hence we may have some commercial generation of

nuclear power but it will be commercial only in the sense that it will be operating more or less regularly day in and day out," predicted Philip Sporn, president, American Gas & Electric Service Corp., New York City. With estimates of nuclear power-plant costs ranging from \$140 to \$1,000 per kilowatt, commercial production of power from atomic fission still is an open question. Before firm costs estimates can be made, several problems must be solved, including disposal of radioactive ash and gas, development of materials for plant and reactor, the possibility of "breeding" (i.e., production of more fissionable material than is consumed in reactor operation) and development of chemical processes, Mr. Sporn declared. To solve these problems, the Atomic Energy Commission has contracted for expenditures of over \$200,000,000 in the past three years to develop a reactor and has built and planned some experimental structures.

If power can be generated successfully by atomic energy, it probably will be produced not directly from nuclear fission but rather by conventional methods employing heat or hot gases and boilers or turbines. Assuming that costs can be kept within reach, the industries most likely to be affected by atom-generated power are those in which power used per worker is high—for example, magnesium and aluminum reduction, copper refining, cement, chlorine, caustic soda, carborundum, ferro-alloys, electric steel and others.

"What, meanwhile, should coal do?" Mr. Sporn asked. Since nuclear power is a long way off, even if it eventually is developed successfully, coal, like the electric-power industry, should take steps to expand capacity, boost efficiency and cut costs. If nuclear power does come, its competitive strength still will depend on how successfully coal can advance its own technology and discharge its social-economic responsibility, Mr. Sporn concluded.

The coal industry should (1) set up a comprehensive research program to develop markets and cut costs, (2) find ways to help customers take advantage of advances in utilization and (3) organize a group to spearhead research planning, promote developments and integrate a broad program, said Clyde Williams, director, Battelle Memorial Institute, Columbus, Ohio. Mr. Williams was the first of a series of speakers on Bituminous Coal Research at the Friday morning session.

Early research projects launched by BCR were short-range, dealing mostly with smoke, ash removal, combustion and dedusting, but with coal's cost advantage gone, a broad, long-range research plan now is needed, Mr. Williams warned. This program should include, among other things, better ways of gasification and liquefaction; reduction of costs by new-type machines, simplified transportation and better materials-handling; and a long-

range merchandising program to develop better coal and, in cooperation with other industries, widen the uses for coal and coal-generated power in industrial plants.

For every dollar spent by BCR on research alone, an additional \$9 must be found somewhere to establish the commercial feasibility and application of the results, said M. L. Patton, vice president (sales), Truax-Traer Coal Co., Chicago. Thus parts of BCR's funds have been used to carry some projects beyond the laboratory stage into engineering design, pilot-plant operation, field testing and market promotion. However, further funds will be needed for wider commercial introduction of research developments, Mr. Patton warned. Citing BCR's promotional activities in the past year, including regional meetings with coal companies, conferences with manufacturers, contacts looking to better preparation and publication of progress reports and BCR papers, he urged that the industry at large take over a bigger share of the cost and effort of getting research findings into use. This can be done by sales methods that show customers how the industry is keeping pace with progress, by enlisting the help of coal-company fuel engineers and by coordination of BCR efforts with those of NCA, BCI, CHS and regional associations, he said.

How other industries are taking up coal research was outlined by Carl E. Miller, technical advisor, Battelle Memorial Institute. As illustrations of programs by other industries, Mr. Miller cited efforts to develop a better gas producer, sponsored by BCR, Battelle, certain members of the Diesel Engine Manufacturers Association, the Glass Container Manufacturers Institute and Pittsburgh Plate Glass Co.; a project undertaken by General Electric Co., looking to development of a coal-burning gas turbine; studies of cinder collection by the railroads of Allegheny County, Pa., and BCR; railroad electrification research sponsored by coal companies, railroads, electric utilities and equipment manufacturers; and spreader-stoker studies sponsored by BCR and a group of spreader-stoker manufacturers. The fact that outsiders are showing a financial interest in coal research

should spur coal to increase its own efforts, Mr. Miller pointed out.

The growing trend toward liquid and gaseous fuels, together with the increase in industrial applications in which only a liquid or a gas will serve, points up the need for developing a better gas producer, said John Mitchell, director of research, Eastern Gas & Fuel Associates, Boston, Mass. Faults of the conventional gas producer are low output relative to size and cost, limits as to the types of coal that can be used, impurities in the raw gas and low heat value requiring large pipes. Its big advantage is economical construction in a wide range of sizes.

Research looking to a new type of

Diamond Core Drilling

CONTRACTORS



Testing mineral properties with our light gasoline drills. SATISFACTORY COAL CORES GUARANTEED. Ground solidification by our pre-pressure grouting method for shafts. Wet mine areas, horizontal holes for drainage. Electric drills for inside mine drilling.

MOTT CORE DRILLING CO.
HUNTINGTON • WEST VIRGINIA

Use FLEXIPIPE... the quality ventilating tubing



FLEXIPIPE

Directs fresh air where you need it

The new improved Flexipipe is efficient, serviceable and economical. It's made in a variety of diameters and lengths and with various accessories to take care of your individual requirements. Write us for complete information and sample.

BEMIS BRO. BAG CO.
412 Poplar Street, St. Louis 2, Mo.
FLEXIPIPE: Reg. U.S. Pat. Off.

WHAT ARE YOUR CORE DRILLING DEMANDS ?

**SPRAGUE & HENWOOD, INC.
MEETS YOUR INDIVIDUAL
REQUIREMENTS!**



Core Drilling to meet your needs—that is a special advantage of Sprague & Henwood's Core Drilling Machines, designed to perform the work expected of them. They are modern in every respect... are engineered to meet the strenuous demands of present day core drilling jobs... and construction enables them to withstand long, rugged service at high speed! Available with two distinct types of swivel heads: "Screwfeed" and "Hydraulic".

You will profit by the many features offered in Sprague & Henwood's Core Drilling machines. For full details and advantages write us today.



**BORTZ
Diamond Bits**
Are also manufactured by Sprague & Henwood, Inc. . . . full details sent on request.

Also
Core drilling by contract

Sprague & Henwood, Inc.
DEPT. X
SCRANTON 2, PA.

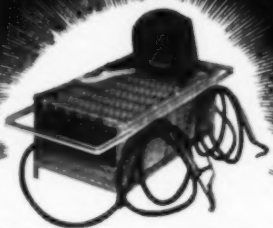
gas producer already is under way, Mr. Mitchell said. The object is a producer having the following characteristics: high rate of gasification, use of a wide range of coals, automatic or semi-automatic operation, adaptability to different sizes, high thermal efficiency, low investment cost and high purity of product. Gas purity is a special objective if, as diesel-engine manufacturers hope, stationary and mobile gas producers can be developed as a source of fuel for dual-fuel diesel engines.

Regarding its research program, the coal industry should keep three facts in mind, said E. H. Davis, president, New York Coal Co., Columbus, Ohio. These facts are: (1) development of projects to practical performance takes a long time; (2) promotion of completed projects is a hard job; and (3) the cost of promotion often amounts to many times the cost of development. Reviewing the slow progress of coal-sponsored research, Mr. Davis declared that an earlier start would have simplified problems growing out of a variety of types and sizes of coal, would have enabled the industry to proceed more leisurely and therefore more thoroughly in its program and would have developed ways for using coal to slow down the advances of competitive fuels. These facts should point up the value of research now and spur the industry to support research generously. "The only way out of our present situation is through a far-sighted research program," he concluded.

Displaying the first piece of coal mined by the design machine of the Mining Development Committee, Gerald Von Stroh, committee director, announced that the basic design principle has been developed and a test unit embodying a single element of the basic design principle has been tested underground. "Further refinements of this single element could be applied to any cutting machine and convert it into a creditable continuous mining machine," he declared, though he pointed out that further developments will be needed to meet the specifications of the Mining Development Committee. A second test unit now is under construction. It will make a cut 70 in wide, producing about 15% cuttings in a 42-in seam, the remainder being mostly above 2-in with an upper limit of about 12x12 in.

In addition to studies and tests looking to a continuous miner, the committee has tested a stainless-steel conveyor belt, with the probability that such belts will be ready for commercial use within six months at considerable savings under the cost of rubber belts, Mr. Von Stroh reported. Also, the committee is evolving a flexible face conveyor, which may cut mining costs as much as 15c per ton, and a new type of bit, which may increase 10 times the time between bit changes. In addition, consultations with equipment manufacturers and inventors have sped other develop-

MESCO ARC
WELDING
MACHINES



SHIPPED IMMEDIATELY FROM STOCK

Here's the perfect welding machine for all types of bond welding as well as general repair work in mines where 250-275 d.c. or 500-550 d.c. is used. Both high and low styles are engineered for your convenience under any condition. Can be regulated by 20 ampere steps to full capacity of 240 amps. We also sell a complete line of accessories for electric welding.

Write today for price list.

Mosebach Electric & Supply Co.

1115 Arlington Avenue Pittsburgh 3, Pa.
HElock 8332

"FIRST IN THE
FIELD"

WEDGE-WIRE
Aluminum
**VIBRATOR
SCREENS**

The cross-section above shows how KUBERLOT screens operate on a non-clogging, non-binding principle.

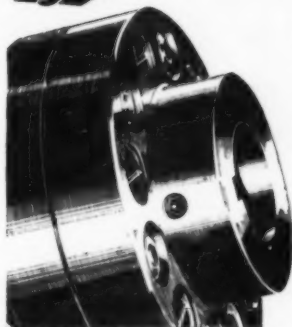
**THOROUGHLY
TESTED
AND PROVEN
IN ACTUAL
TESTS**

Here is a new type of vibrator screen that is receiving acclaim wherever it is used. Like all Wedge Wire Screens, it is precision-made of quality materials and will give long life and perfect performance. WEDGE WIRE Screens will help maintain the efficiency of your preparation plant. **SEND FOR COMPLETE LITERATURE & DATA**

Wedge-Wire
CORPORATION

5602 CLARK AVE CLEVELAND 2, OHIO

AJAX FLEXIBLE COUPLINGS



AVAILABLE WITH NEOPRENE BUSHINGS

Uninterrupted performance assured on installations involving liquid or air-borne chemicals, oils and other difficult conditions. Write for complete information.

AJAX FLEXIBLE COUPLING CO. INC.
17 ENGLISH ST., WESTFIELD, N.Y.

WASTES NO TIME . . .



. . . Locating Buying Information

Time is at a premium in the office of Gomer Reese, Mine Superintendent of Moffat Coal Company, Oak Creek, Colorado. That is why he appreciates the complete, easy-to-get-at Buying Information about machinery, equipment and supplies that is available in McGRAW-HILL'S PRE-FILED MINING CATALOGS. Of his use of this Catalog he recently wrote:

"My 1948/49 Catalog is a great help in finding what I want."

If PRE-FILED MINING CATALOGS is not available for buying reference at your mine, write to McGRAW-HILL CATALOG SERVICE, 330 West 42nd Street, New York 18, New York. There is no charge to qualified users.

ments and conferences with coal operators and manufacturers have saved some money by spotting poor economies or engineering inefficiency, he declared.

Stressing the importance of vocational training and education in an industry facing machine operations, sharp competition and a disturbing labor situation, Henry C. Woods, chairman, NCA Vocational Training and Educational Committee, and chairman of the board, Sahara Coal Co., Chicago, urged coal operators to cooperate closely with educators in high schools and colleges. Mr. Woods spoke at the closing session Friday afternoon, with Hugh B. Lee, vice president, Maumee Collieries Co., Terre Haute, Ind., presiding.

Aims of the committee are to (1) stimulate instruction in coal-mining engineering, (2) encourage scholarship awards to worthy candidates, (3) provide the industry with a higher standard of engineering skill and (4) prepare more young men for the executive positions that must be filled in the future, Mr. Woods explained. The weakest link in the educational program is between the operators and school authorities but it can be strengthened if operators personally will carry information to schools and colleges in their areas. Mr. Woods referred to educational programs at the University of Illinois, West Virginia University and Pennsylvania State College and to scholarships available at these and other colleges as examples of what might be done on the college level to train young men for the coal industry. The value of college training can be enhanced by offering college men summer work in the mines, he explained.

Reporting the accomplishments of M. D. Cooper, manager, Vocational Training and Educational Committee, Mr. Woods cited visits by Mr. Cooper to 53 schools and colleges between Aug. 1, 1948, and July 31, 1949; participation in 63 engineering and educational meetings at which he made 29 speeches; 27 calls at offices of association secretaries; 40 calls at offices of engineers; 17 visits to coal mines; 34 calls at operators' offices; publication of numerous articles; preparation of a directory of educational institutions offering studies in coal mining; and authorship of a leaflet on the problem of technically trained personnel for bituminous coal.

Mr. Cooper, who spoke briefly following Mr. Woods, stated that mining colleges generally are favorably disposed toward coal but feel that the industry is not taking full advantage of what they offer. The high schools probably are the weakest link in the industry's educational program but even here, there are signs of improvement, Mr. Cooper said.

Introducing an hour-long discussion of strip-land reclamation, R. L. Ireland Jr., president, Hanna Coal Co., Cleveland, Ohio, stressed the importance of the committee's work in ex-



Protect

YOUR MACHINERY with a STEARNS MAGNETIC PULLEY!

Metallic refuse can cause costly repairs and possible shut-downs but at the American Crystal Sugar plant in Moorhead, Minn., a Link-Belt installation, this Stearns Electro-Magnetic Pulley helps guard against trouble.

If you want automatic low-cost protection against tramp iron hazards, consult Stearns Magnetic — our engineers have the know-how and experience to solve your problem.

Years of research and development by Stearns engineers have produced an outstanding product in magnetic pulleys — the reason for their wide acceptance in all industries for removing tramp iron, for separation and reclamation of materials.

For complete specifications and operating data on Stearns Electro and Permanent Magnetic Pulleys and Pulley Separators, write for Bulletins 303 and 350.



Electro and Permanent Magnetic Pulleys and Pulley Separators to fit your needs.

IF IT'S MAGNETIC WE MAKE IT!

PULLEYS • BRAKES • DRUMS
CLUTCHES • SEPARATORS
FILTERS • ORE CONCENTRATORS
Separation or Lifting MAGNETS

Stearns
MAGNETIC
MANUFACTURING CO.

661 S. 28th St.

Milwaukee 4, Wis.

Conveyors and Picking Tables



\$395.00

Lengths from 10' to 500', widths to 60".

Troughing Idlers



\$18.50

Troughing and picking table idlers are available in all belt widths.

Single-roll idlers \$8.25

IMMEDIATE DELIVERY

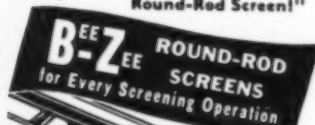
Call or Write

BONDED SCALE & MACHINE CO.

2195 S. Third St. Columbus 7, Ohio
Phone Garfield 2186 University 2832, Evenings
Manufacturers of Scales, Conveyors, Conveyor Supplies, Idlers, Vibrating Screens, Crushers and Feeders



Practical Coal Men Report:
" . . . as much as 30 times more life from this Round-Rod Screen!"

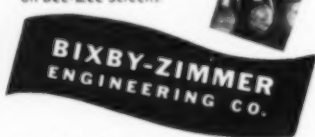


BEE-ZEE ROUND-ROD SCREENS
for Every Screening Operation

Bixby-Zimmer Round-Rod Screens keep screening losses to a minimum. All-welded construction of hard alloy stainless steel is one reason. Exclusive Round-Rod design is another. Openings between rods can't increase in size—even with 50% wear! No wonder practical coal men report "30 times more life!"

Get this New Catalog

Write for new catalog giving complete information on Bee-Zee Screens.



BIXBY-ZIMMER ENGINEERING CO.

111 Abingdon St. Galesburg, Ill.

changing ideas about use of mined-over land among groups from several states.

Strip-mine soil in Illinois generally is well suited to pasture use, declared A. F. Grandt, assistant, Department of Agronomy, University of Illinois, Urbana. Except for nitrogen, essential plant nutrients are at a high level in spoil land, with toxic acids making up less than 5% of the entire stripped area in the state. Best results have been obtained with alfalfa, sweet clover, red clover, birdsfoot trefoil, lespedeza, orchard grass, tall fescues, red-top, timothy, bromegrass and bluegrass, he pointed out. Using animal gains as a measure, pastures on strip lands are as good as those on unstripped lands. However, successful use of mined-overland requires technical skill and careful planning in facilities and equipment, he warned.

Increasing population and decreasing areas of good agricultural land soon may create a problem of food supply and thus cut back the American standard of living unless a vigorous program of land conservation and utilization is undertaken, warned Kent Leavitt, president, National Association of Soil Conservation Districts, Millbrook, N. Y. Reporting his observations during a flight over western Pennsylvania, Ohio and Indiana, he stated that coal strippers are far ahead of many farmers in land use. Landowners, he declared, are trustees of a natural resource, deserving a fair income during their tenancy but obligated to pass their land down to the next generation as an undamaged capital resource. However, this should be accomplished not by federal laws but through the cultivation of a far-seeing attitude among industrial leaders, he argued.

Coal strippers will find soil conservation district organizations helpful in their efforts to put stripped lands to good use, Mr. Leavitt said. There now are 2,150 of these districts, scattered through every state in the country and administered locally by farmers and landowners who integrate the work and skills of college experts, county agents, federal soil-conservation specialists and other interested groups. Coal strippers, besides enlisting the help of soil conservation districts in their own problems, also can work with them in promoting scientific use of soils, helping direct and operate the districts and building stronger state associations to integrate the program and keep state legislatures and bureaus informed.

Recommendations of the finance and executive committees presented at the closing session continued the present 7.5-mill assessment and fixed the budget for the coming year, including activities of BCI and CHS, at \$1,865,550, a reduction under the amount actually spent in 1948-49. Among other resolutions adopted was one urging an equitable tax system to meet any contemplated increase in social-security and welfare programs.

WARM FEET

MAKE A GOOD WORKMAN BETTER!

Equip your Picking Tables with

GUYAN FOOTWARMERS

Here, a small investment will pay big dividends. A comfortable worker stays on the job and works more efficiently!

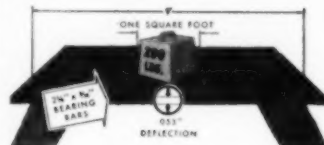
GUYAN MACHINERY CO. LOGAN W. VA.

For **STRENGTH** specify

TRI-LOK

RECTANGULAR

OPEN STEEL FLOORING



The locked-in strength of Tri-Lok enables it to stand up under heavy loads—even on long spans. No rivets, bolts, or welds are used in the construction of Tri-Lok; this feature eliminates the possibility of loose joints.

Tri-Lok is also available in Diagonal, or Super-Safety U-type Flooring, and in Stair Treads of all types. Write for Bulletin KR 1140.

DRAVO CORPORATION

National Distributor for the Tri-Lok Company
Dravo Bldg., Pittsburgh 22, Pa.

Sales Representatives in Principal Cities



"Sutton" SAND DRYING STOVES

The Standard for Over Forty Years

Burns Any Type of Fuel

The "Sutton" Sand Dryer may be fired with any type of fuel. While most "Sutton" Sand Dryers are equipped to burn coal, they can be furnished with burners for natural gas or fuel oil.



"SUTTON" FEATURES

- Simple in operation
- No skilled labor necessary
- Made in four sizes
- Lowest original cost
- Economical up-keep
- Topmost efficiency

SATISFACTION GUARANTEED

Catalog and Prices sent upon request

INDIANA FOUNDRY COMPANY

950 Oak Street

Indiana, Pa.

ALLIGATOR



BELT LACING

Every
Tooth
a Vise*



- ★ For Transmission and Conveyor Belting of all kinds. Excellent for Package Conveyors.
- ★ Separable and smooth on both sides.
- ★ 12 Sizes: For belts from 1/16" to 5/8" thick—and any width.
- ★ Made of Steel, "Monel", "Everdur".

Order from Your Supply House

FLEXIBLE STEEL LACING COMPANY

4638 Lexington Street • Chicago 44, Illinois



JUST A HAMMER
TO APPLY IT

HERE'S MORE POWER TO YOU!

Support
**LOW-VOLTAGE ACCESSORIES
WITHOUT REDUCING
HIGH-VOLTAGE CURRENT**

ALTERNATOR of Leece-Neville 7-Volt A-C System for every requirement up to and including 80 amperes. 14-Volt Systems available with ratings of 60, 80, 100 and 150 amperes.

WITH A Leece-Neville

HIGH-OUTPUT A-C GENERATING SYSTEM

- Whatever your requirement for power to support automotive type lighting and other low-voltage accessories on continuous miners, loaders and other mining equipment . . . the correct Leece-Neville High-Output A-C Generating System will meet it so that you don't have to reduce high-voltage current.

For high current output at fast and slow speeds on above-ground mining vehicles . . . there is no match for A-C generating the Leece-Neville way. In keeping batteries up, and costs down, in supporting the unlimited use of accessories . . . Leece-Neville A-C Generating Systems

have set amazing records on all kinds of vehicles since 1946. Return coupon below for all the facts!

LEECE-NEVILLE

Pioneer and STILL Quality Leader

CRANKING MOTORS • GENERATORS • VOLTAGE REGULATORS • SWITCHES

THE LEECE-NEVILLE CO., Department H, Cleveland 14, Ohio
Please send descriptive literature on your High-Output A-C Generating Systems.

NAME _____

ADDRESS _____

CITY _____

STATE _____

Coal Publications

Suspension Roof Support: Progress Report I, by Edward Thomas, A. J. Barry and Arthur Metcalfe. U. S. Bureau of Mines, I. C. 7533. 13 pp plus 16 pp of photos and drawings. 8x10½-in; paper; mimeo. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh, Pa. No one method of suspension roof support is practicable for all mines and roof

bolting is not a "cure-all" for all types of roof. However, the method has been applied extensively under various roof conditions and, where successful, promises to be useful in new and more efficient methods of mining.

Evaluating Performance of Anthracite Fine Coal Cleaning Plants, by J. D. Clendenin. Reprinted from Transactions of the Seventh Annual Anthracite Conference at Lehigh University, 1949. 30 pp. 6x9-in; paper. Free, Mineral Industries Experiment

Station, Pennsylvania State College, State College, Pa. Application, limitations and merits of the ash-balance method of determining coal or weight recovery; also problems and precautions in sampling fine-coal slurries and pulps.

Ohio Coal and Oil Studies—Part I: Investigation of the Washability of Several Ohio Coals, by T. H. Wilson; Part II: Survey of Production of the Corning Ohio Oil Pool, by T. H. Kerr. Ohio State University Engineering Experiment Station, Bulletin 138. 30 pp. 6x9-in; paper. 75c, University Engineering Experiment Station, Columbus 10, Ohio. Tests on Washington coal, Lower Kittanning No. 5, Middle Kittanning No. 6, Pittsburgh No. 8 and Lower Freeport No. 6a to investigate improvements and economic feasibility of washing to less than 3% ash.

The Domestic Mining Industry of the United States in World War II, by J. D. Morgan Jr. National Security Resources Board and School of Mineral Industries, Pennsylvania State College. 500 pp. 8½x11-in; paper. \$2, Supt. of Documents, Government Printing Office, Washington, D. C. Shortcomings, contributions and problems of the mineral industries in past wars and recommendations for federal, state and industry policies that will guarantee national strength in case of future wars.

Annual Report of Research and Technologic Work on Coal, Fiscal Year 1948, by A. C. Fieldner and Sidney Gottlieb. U. S. Bureau of Mines, I. C. 7518. 87 pp plus 60 illustrations and graphs. 8x10½-in; paper; mimeo. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa. Work done by the Bureau on coal and coal products from July 1, 1947, to July 1, 1948.

Summary Reports to the U. S. Bureau of Mines on Areas Suitable for Synthetic Liquid Fuel Plants in (1) Western Kentucky, Northwestern Colorado and Southeastern Texas and (2) Southeastern Montana. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa. Information on location of underground and strip coal, oil shale and natural gas in adequate quantities to justify construction of synthetic liquid fuel plants. These two summary reports are part of a Bureau-sponsored survey being made in 37 states and Alaska.

Two devices to Prevent Electric Arcs With Airox Operations in Coal Mines, by F. J. Gallagher. U. S. Bureau of Mines, I. C. 7515. 5 pp. plus 3 pp. of illustrations. 8x10½-in; paper; mimeo. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh, Pa. How reinforced rubber-jacketed tubing and a new-type insulating coupling eliminate arcing at the face between Airox lines and power conductors such as tracks and pipe lines.

PROFESSIONAL SERVICES

ALLEN & GARCIA CO.

ENGINEERS AND BUILDERS OF
MODERN COAL OPERATION
Authoritative Valuations and Reports of
Mining Properties, Equipment and Operations.
332 S. Michigan Ave., Chicago
120 Wall Street, New York, N. Y.

HERBERT S. LITTLEWOOD

CONSULTING ENGINEER
Application — Supervision of Installation
Maintenance — Inspection — Testing
POWER-HAULAGE-HOISTING
VENTILATION
1104 South Braddock Avenue, Pittsburgh 18, Pa.

GEO. S. BATON & COMPANY

Consulting Engineers
Cost Analysis — Valuations
Mine and Preparation Plant Designs
1108 Union Trust Building Pittsburgh 19, Pa.

P. R. PAULICK

Consulting Mining Engineer
Design — Modern Mining Methods
— Mine Mechanization Systems
Application — Cost Analysis
Domestic and Foreign Work
South Park Road Library, Pa.

F. CARL COLCORD CONSULTING ENGINEER

COAL LAND VALUATIONS
MINE INSTALLATIONS
OPERATION
Box 268, Paris, Ky. Phone 231W

PIERCE MANAGEMENT, INC. MINING ENGINEERS

A Background of 22 Years of Design, Consulting,
and Management Service to Coal and Mineral
Industries in 28 States and 18 Foreign Countries.
Scranton Electric Bldg. 1025 Connecticut Ave., N.W.
Scranton 3, Pa. Washington 6, D. C.

EAVENSON & AUCHMUTY

Mining Engineers
COAL OPERATION CONSULTANTS
VALUATION
2720 Koppers Bldg. Pittsburgh 19, Pa.

K. PRINS & ASSOCIATES

Engineering and Consultants
Designers of low cost coal preparation plants.
Tipples and structures.
THE PRINS COAL WASHER
Wellston Ohio

HENRY O. ERB

COAL PREPARATION CONSULTANT
PLANT DESIGN AND OPERATION
Midwestern Representative
"VIKING" HOT VAPOR
OIL TREATING PROCESS
818 So. 4th St. Terre Haute, Ind.

TEMPLETON-MATTHEWS CORPORATION

Designing Engineers—Consultants—Builders
MODERN COAL PREPARATION PLANTS THRU
"CO-OPERATIVE ENGINEERING"
966 06 Ryansville Bldg. Terre Haute, Indiana

FERGUSON-GATES ENGINEERING CO.

Registered Civil and Mining Engineers
Reports on Developed and Undeveloped Coal
Properties
Valuations and Appraisals
Studies of Airborne Dust and Dust Control in the
Mines
Consultation Service
Allen Building Telephone 8721 P. O. Box 872
Rockier, W. Va.

A. HAMILTON WOOD

CONSULTING MINING ENGINEER
AND GEOLOGIST
50 YEARS COAL EXPERIENCE IN THE SOUTH
COAL LAND EXAMINATIONS
REPORTS AND VALUATIONS
Hendersonville, N. C. Phone 297

J. H. FLETCHER

38 Years
Continuous Consulting Service
to Coal Mines
Telephone Harrison 7-5151
332 S. Michigan Ave. Chicago 4, Illinois

J. W. WOOMER & ASSOCIATES

Consulting Mining Engineers
Modern Mining Systems and Designs
Foreign and Domestic Mining Reports
National Bank Building Wheeling, W. Va.



WESTERN
HEMISPHERE

CINCINNATI CUTTER BAR



CINCINNATI
SPROCKET



EASTERN
HEMISPHERE

Wherever Coal is Mined You Will Find "Cincinnati Mine"

THE WORLD'S FINEST COAL CUTTING EQUIPMENT

In thousands of mines all over the World, Cincinnati Chains, Bits and Bars are helping Mine Operators reduce coal cutting costs. The wide acceptance of Cincinnati Coal Cutting Equipment over a period of years is proof of its top performance and dependability . . . proof of the soundness of the engineering and design built into Cincinnati Coal Cutting Equipment. If you have a particular cutting problem, let us hear from you. The chances are we can help you as we have helped hundreds of the world's largest producers. Feel free to call on us or any one of our representatives at any time.



Alloy Steel Heat-treated Rivet that holds bearing pin against longitudinal displacement. Easily removed.



Hardened Eccentric Pin is designed so it can't turn in block . . . placing joint Wear between pin and insert.



Replaceable long-life, hardened alloy steel Connector Insert that gives new factory joint accuracy to a worn connector.



CINCINNATI DUPLEX CHAIN

The Cincinnati Duplex Chain with the Duplex Bit is recommended for maximum cutting efficiency. The block and connector are drop forged of high grade alloy steel, carefully heat treated and scientifically engineered to withstand hard usage.



DUPLEX BIT

Made for exclusive use in Cincinnati Duplex Chains. A double ended, reversible, low cost long life bit that's heat treated to specific cutting requirements.



CINCINNATI STANDARD CHAIN

Similar in design to the DUPLEX . . . accommodates either standard mine sharpened bits or the popular Stanex Holder and Bit.



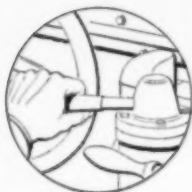
STANEX MOUNTING

Combination of strong durable holder and Stanex reversible Double Ended Bit to fit Cincinnati Standard Chain or other standard chains.

THE CINCINNATI MINE MACHINERY CO.

2983 SPRING GROVE AVENUE • CINCINNATI, OHIO

users **CUT COSTS** with



WESTINGHOUSE HYDRAULIC BRAKES

1. Brake shoe life increased from 1 week to 3 months
2. Wheel turning decreased 30%
3. Motor bucking to check speed or stop entirely eliminated
4. Shocks to mechanical and electrical apparatus greatly reduced
5. Less sand required . . . better rail contact cuts power loss and overheating.

The results listed show why users say these brakes pay for themselves in a short time through reduced maintenance. Simple, rugged, compact equipment can be fitted into available space. Installation can be made any time locomotive is shopped for maintenance. Ask for Bulletin SP 9092 for details.

Westinghouse Air Brake Co. ✕

Industrial Division: Wilmerding, Pa.

Stocked and Distributed By **NATIONAL MINE SERVICE COMPANY**
Buckley, West Virginia

**BUY THE TOOL
THAT'S BUILT
FOR THE
JOB!**



\$155.00

The Cincinnati
TRADE MARK
ONE-MAN COAL DRILL

... specifically designed and built for drilling coal. Universal motor — operates on AC or DC current. Cuts costs. More power "pound for pound" — more efficiency day after day!

Write today for FREE illustrated bulletin.

THE CINCINNATI ELECTRICAL TOOL CO.

Division of The R. K. LeBlond Machine Tool Co.
2635 MADISON ROAD • CINCINNATI 8, OHIO

Core Drilling *by Contract*

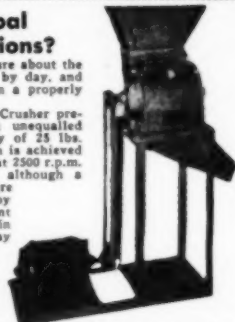
Exploration for coal and other mineral deposits.
Foundation test boring and grout hole drilling
for bridges, dams and all heavy structures.
Core Drill Contractors for more than 60 years

JOY MANUFACTURING CO.
Contract Core Drill Division
MICHIGAN CITY, INDIANA

Does Your Coal Meet Specifications?

There's only one way to be sure about the quality of your product, day by day, and that is by constant testing in a properly equipped laboratory.
The WISE Laboratory Coal Crusher prepares coal for testing with unequalled speed and economy. Capacity of 25 lbs. per minute through $\frac{1}{4}$ " screen is achieved with $\frac{1}{4}$ " hp. motor operating at 2500 r.p.m. WISE Laboratory Crushers, although a comparatively new product, are already used and endorsed by some of the most prominent coal testing organizations in the United States. Write today for complete information.

O. B. WISE CO.
Knoxville, Tenn.



At Your Service . . .

The Searchlight Section is at your service for bringing business needs or "opportunities" to the attention of men associated in executive, management, sales and responsible technical, engineering and operating capacities with the industry served by this McGraw-Hill publication.

Sink-Float Magnetite "MAGNAFLOAT"

Correctly sized Magnetite for sink-float treatment of coal or other minerals. Standard grinds;

Grade A—Approximately 100 mesh with 60 to 70% passing 325 mesh.

Grade B—Approximately 100 mesh with 90% passing 325 mesh.

Other sizes to order.

Executive Offices

FOOTE MINERAL COMPANY, INC.
420—Eighteen West Chelton Bldg. Philadelphia 44, Pa.
Over 30 years grinding experience.

ONE CALL
gets 'em all

WEST VIRGINIA BEARINGS-INC.

CHARLESTON 2 • 1516 Kanawha Blvd., West • Capitol 23183
HUNTINGTON • 2761 Fifth Avenue • Phone 36446
WHEELING • 518 Main Street • Wheeling 1256

3 complete stocks of Bearings, Seals, Electric Motor Bushings and
Special Ball and Roller Bearing Grease for all mining equipment.

Authorized Stock-Carrying Distributors for:

BEARINGS

Aetna Ball Bearing Co.
American Roller Bearing Co.
Auburn Ball Bearing Co.
Ball and Roller Bearing Co.
Dodge-Timken Transmission
Fafnir Bearing Co.
Hyatt Roller Bearing Co.

Kilan Manufacturing Corporation
Link-Belt Pillow Blocks
McGill Ball & Needle Bearings
Miniature Precision Bearings
New Departure Mfg. Co.
Norma-Hoffmann Bearings
Rollway Bearing Company, Inc.
Schatz Manufacturing Co.
Split Ball Bearing Corporation

SKF Industries, Inc.
Timken Tapered Roller Bearings
Torrington Bearings

BEARING SPECIALTIES

Bearing Lock Nuts & Lock Washers
Bunting Bronze Bearings and Bars
Chicago Rawhide Manufacturing Co.
Concentric Live Centers

Keystone Ball Bearing End Belts
Lubriko Bearing Grease
Oilite Oil-Cushion Bronze
Owatonna Bearing Removal Tools
Sturdimatic Live Centers
Thomson Ball Bushings
United American Metals (Babbitts)
Victor Oil Seals
Waldes-Kohinoor Retaining Rings

LONGER LIFE for ball and roller bearings

Your investment in anti-friction bearings is certainly great enough to warrant your investigating the possible savings to be made through the use of LUBRIPLATE lubricants. They actually preserve bearing surfaces, arrest progressive wear and protect against rust and corrosion. There are LUBRIPLATE lubricants for all speeds, all operating temperatures and conditions.

Write for a copy of "The LUBRIPLATE FILM" written especially for your industry.

LUBRIPLATE

DEALERS FROM COAST TO COAST
CONSULT YOUR CLASSIFIED TELEPHONE BOOK



PLATEGRIP REPAIR PLATE

For mending and
patching heavy conveyor belts

Multiply the serviceable life of your heavy conveyor belts by patching worn spots and closing tears with PLATEGRIP Repair Plates. Easily applied, anywhere, they make strong, flush, dust-tight joints, that ride smoothly over all pulleys, outlast the belt.

HINGED PLATEGRIP BELT FASTENERS (No. 500)



Belt to belt ends (any width) make a strong, flush, flexible joint that can be coupled, uncoupled or added to by simply pulling flexible hinge pin. For heaviest conveyor belts.

WRITE FOR CATALOG
ARMSTRONG-BRAY and CO.
5340 Northwest Highway
Chicago 30, Illinois



COAL SPRAY OIL

Specification Product
Odorless and Penetrating

DIESEL FUELS All Types

MOTOR FUELS All Grades—
60 to 87 Octane

PROMPT DELIVERY

COMPETITIVE PRICES

Write, Phone or Wire

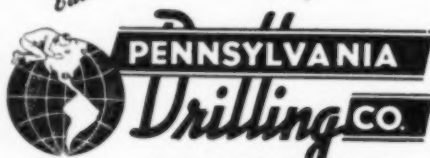
TROY REFINING CO., INC.

Sales Office—Grain Bldg., Evansville, Indiana
Refinery—Troy, Indiana

**BARGE
CAR or
TRUCK
LOADS**

*"We look
into the
Earth"*

CORE DRILLING —anywhere!



DRILLING CONTRACTORS AND MFRS.

1205 Chartiers Ave. **PITTSBURGH, PA.** WAInot 1-8816

At Your Service

—for bringing business needs or "opportunities" to the attention of men associated in executive, management, sales and responsible technical, engineering and operating capacities with the industries served by the following McGraw-Hill publications:

THE SEARCHLIGHT SECTIONS

(Classified
Advertising)

Air Transport
American Machinist
Aviation Week
Business Week
Bus Transportation
Chemical Engineering
Coal Age
Construction Methods
Electrical Construction
& Maintenance
Electrical Merchandising
Electrical Wholesaling
Electrical World

Electronics
Engineering and Mining
Journal
Engineering News-
Record
E. & M. J. Markets
Factory Management and
Maintenance
Food Industries
Power
Product Engineering
Textile World
Welding Engineer

For advertising rates or other information
address the

Classified Advertising Division

McGraw-Hill Publishing Co., Inc.

330 W. 42nd Street

New York 18, N. Y.

The greatest help a coal mining man can have—

IF YOU want to make sure of getting your certificate of competency—sure of winning a bigger job with bigger pay, get Beard's great books today and put them to work for you.

In these three books you have a practical, always-on-the-job guide that will help you solve the problems you face every day, show you what to do, tell you why it should be done.

Beard's

Mine Examination Questions and Answers

3 Volumes—\$8.25, Payable in Three Easy Installments

THESE books explain what a man must know in order to become a mine inspector, a mine foreman, assistant foreman, fireboss, hoisting engineer, safety engineer, shot-firer, etc.

They give you complete and authoritative information about air and gases, explosives, safety requirements and methods, mechanics, engines, hoisting, drainage, pumping, ventilation, timbering, instruments, and every other detail that the practical mining man must know.

Can you answer these questions—

What is meant by splitting the air current and what are the advantages derived from such methods?

Can a miner live in air in which the oxygen content is reduced to 17 per cent?

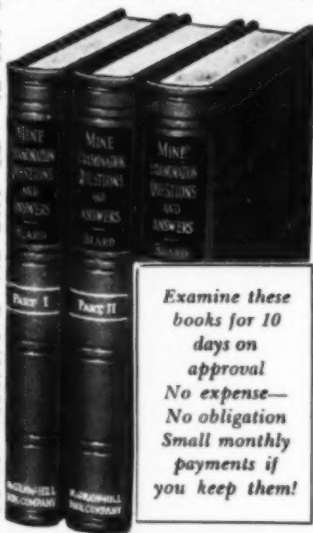
Name five duties imposed on mine foremen by law?

In what time can an engine of 40 effective hp. pump 4,000 cu. ft. of water from a shaft 350 feet deep?

What are the advantages and disadvantages of a gasoline pump, an air pump and an electrical pump?

What is the estimated tonnage per acre, per foot of thickness, for bituminous coal?

These are but a few of the more than 2,000 questions given in Beard's books together with full, correct answers. Hundreds of men have used this method to prepare for higher, better jobs. You can, too, if you have the Beard books and plan to use them systematically. They are the best investment that a mining man can make—not only as an aid for passing examinations but as practical reference volumes on everyday mining operation problems.



Examine these
books for 10
days on
approval
No expense—
No obligation
Small monthly
payments if
you keep them!

McGraw-Hill ON-APPROVAL COUPON

McGraw-Hill Book Co., Inc., 330 West 42nd St., New York

Send me, charges prepaid, Beard's Mine Examination Questions and Answers, 3 volumes, for 10 days' examination. If satisfactory I will pay \$8.25 at the rate of \$2.75 in ten days and \$3.00 per month. If not wanted I will return the three volumes.

Name

Address

City

Company

Position

This offer applies to U. S. only.

C-11-49

Searchlight Can Help You!

HUNDREDS of miscellaneous business problems that confront you from time to time, can be quickly and easily solved through the use of the Searchlight Section of this or other McGraw-Hill publications.

The
SEARCHLIGHT
SECTION
of McGraw-Hill
Publications

Can help you by bringing business needs of "opportunities" to the attention of other men associated in executive management, sales and responsible technical, engineering and operating capacities with the industries served by:

Air Transport
American Machinist
Aviation Week
Bus Transportation
Chemical Engineering
Coal Age
Construction Methods
Electrical Construction
& Maintenance
Electrical Merchandising
Electrical World
Electronics
Engineering and Mining
Journal
Engineering News-
Record
E. & M. J. Markets
Factory Management
and Maintenance
Food Industries
Operating Engineer
Power
Product Engineering
Textile World
Welding Engineer

The Searchlight Section is the classified advertising appearing in each of these papers. You can use it at small cost, to announce all kinds of business wants of interest to other men in the fields served by these publications. It is the regular meeting place of the man with a miscellaneous business need and the men who can fill that need.

When you want additional employees, want to buy or sell used or surplus equipment, want additional products to manufacture, seek additional capital, or have other miscellaneous business wants—advertise them in the Searchlight Section for quick, profitable results!

Classified Advertising Division

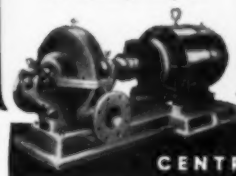
McGraw-Hill Publishing Co., Inc.
330 West 42nd Street New York 18, N. Y.

A SIZE AND A TYPE FOR EVERY APCO TURBINE-TYPE LIQUIDS HANDLING JOB

WATER SUPPLY
CIRCULATING
NON-CLOG
DRAINAGE
IRRIGATION
BOILER FEED
REFRIGERATION
SEWAGE
ETC.



PUMPS "by
Aurora
are the product of
EXCLUSIVE BUILDERS
of FINE pumps



MUNICIPAL
FARM & HOME
REFINERY
DISTILLERY
CORROSIVES
BOOSTER
COND. RETURN
ETC.

Write for
CONDENSED
CATALOG
"M"

**AURORA
CENTRIFUGAL**

DISTRIBUTORS IN PRINCIPAL CITIES



AURORA
PUMP COMPANY

92 Loucks St., AURORA, ILLINOIS

HOFFMAN BROS. DRILLING CO.

Diamond Core Drilling Contractors
Punxsutawney, Pa. • Tel. 382

WE HAVE SPECIALIZED IN TESTING BITUMINOUS COAL LANDS FOR MORE THAN 40 YEARS

GASOLINE • STEAM • ELECTRIC
DRILLS • WE PRE-GROUT
SHAFT LOCATIONS • HORIZONTAL
DRILL HOLES FROM
3" TO 16" FOR DEWATER-
ING MINDS • OUR OPERA-
TORS ARE HIGHLY SKILLED



WE HAVE ALWAYS GUARANTEED SATISFACTORY COAL CORES... We solicit your inquiries

PERFORATED METAL COAL MINING SCREENS

Manufactured exactly to your specifications.
Any size or style screen, in thickness of steel
wanted with any size perforation desired.
We can promptly duplicate your present screens at lowest prices.

CHICAGO PERFORATING CO.

2445 West 34th Place
CHICAGO 8, ILLINOIS
VL 1-6157

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE:

Not available for equipment advertising 90¢ a line. Minimum 4 lines. To figure advance payment count 5 average words as a line. (See 7 on Box Numbers.)
INDIVIDUAL EMPLOYMENT WANTED undisplayed advertising rate is one-half of above rate, payable in advance.
PROPOSALS, 90 cents a line an insertion.

NEW ADVERTISEMENTS received by 10 A.M. November 15th will appear in the December issue subject to limitations of space available.

INFORMATION:

BOX NUMBERS in care of any of our New York, Chicago or San Francisco offices count one additional line in undisplayed ads.
DISCOUNT OF 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals.)

DISPLAYED RATE

The advertising rate is \$7.25 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.
AN ADVERTISING INCH is measured 7/8 inch vertically on one column, 3 columns—30 inches—to a page.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 530 N. Michigan Ave. (17)
SAN FRANCISCO: 98 Post St. (14)

POSITION VACANT

LUBRICATION ENGINEER—Salesman with broad experience in industrial lubrication, preferably with special emphasis on coal industry. Must be able to train petroleum salesmen in specifying industrial oils and greases. P 9238, Coal Age.

BUSINESS OPPORTUNITY

For Sale
Fully Electrified Coal Mine. Opened in veins 6 and 6A Tuscarawas County, Ohio, near Railroad outlet. For information call Canton, Ohio, 47810, or write P.O. Box 537, East Canton, Ohio.

FOR SALE, LIBRARY

Technical library of consulting mining engineer and geologist available complete or in part at reasonable cost. Large numbers of technical transactions, books, maps, surveys, etc., bituminous and anthracite. Inquiries invited.

G. H. ENZIAN
Dorseyville Road, Pittsburgh 15, Pa.

REBUILT MINING MACHINES

3—112 A.A. Goodman Universal D.C.
4—112 G.J.A. Goodman Universal 220 V. A.C.
2—112 G.J. Goodman Universal 220 V. A.C.
1—112 A.B. Goodman D.C. Permissible Type
6—812 Goodman Universal A.C. 220 V.
4—388 Jeffries Machines 250 V. D.C.
6—CET Sullivan Machines A.C. and D.C.
1—78 Sullivan Machine 250 V. D.C.

LOCOMOTIVES

2—4 Ton Goodman Type 32 Ball Bearing
4—8 Ton Goodman Type 32 Ball Bearing, 34 and 42 Inch Gauge
2—8 Ton Goodman Type 2600 Ball Bearing
1—8 Ton G.E. Type 42 Inch Gauge
1—5 Ton Maucha Storage Battery Locomotive, 34 and 42 Inch Gauge, Height 43 inches. Complete with Storage Battery and Charging Panel
2—4 Ton Westinghouse Ball Bearing

LOADING MACHINES

4—8 B.U. Jays, 34 and 42 Inch Gauge on Cabs A.C. and D.C.
3—8 B.U. Jays, 42 Inch Gauge on Cabs D.C.

THOMAS GILLESPIE

State Road 67 Bicknell, Ind.

Electric-diesel generator sets 1250-600 HP. Euclid, bottom, side, rear dumps (11).
Locomotives (8), diesel, gas, 5-35 tons.
Porter, Vulcan 18-ton steam 36" ga. locos.
Bucyrus 2 1/2-yd. elec. horiz. thrust coal loader.
Monaghan 3W diesel Walking dragline.
PBH 1055LC, 3 1/2-yd. diesel stripper, dragline.
Bucyrus 5-yd. 1208 elec. and steam shovels (7).
Manitowoc 3500, 2 1/2-yd. diesel shovel, dragline.
Lima 1201 diesel shovels (2); Osgood 1006.
Monaghan 3W and Page 4215 diesel Walkers.
Merion 7200 Walker, and 8-Erie 10-yd. shovel.
B-E shovel front aft, 2 1/4-yd., 528-558.

H. Y. SMITH CO.

828 N. Broadway Milwaukee 2, Wis.

WANTED

Several U 12 1/2 La-Del shaker conveyors or U 12 1/2 Goodman shaker conveyors.

Mason & Sons Coal Co.
Coshocton, Ohio

WANTED

DIAMOND CORE DRILL
HYDRAULIC FEED 600 FT. CAPAC.
WITH OR WITHOUT ENGINE
W-1135, Coal Age
330 W. 42nd St., New York 18, N. Y.

EMPLOYMENT . . . EQUIPMENT . . . BUSINESS

OPPORTUNITIES

Whatever your need—
think "SEARCHLIGHT" FIRST

LEGAL NOTICE

STATEMENT OF THE OWNERSHIP, MANAGEMENT, AND CIRCULATION, REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912 AS AMENDED BY THE ACTS OF MARCH 2, 1932, AND JULY 2, 1940 (Title 39, United States Code, Section 252) OF Coal Age, published monthly at Chicago, Illinois, for October 1, 1949:

1. The name and address of the publisher, editor, and sales manager is: Publisher, McGraw-Hill Publishing Co., Inc., 330 West 42nd St., New York 18, N. Y.; Editor, Ivan Green, 330 West 42nd St., New York 18, N. Y.; Managing Editor, Nomer, Sales Manager, Reginald N. Davis, 330 West 42nd St., New York 18, N. Y.
2. The owner is: McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York 18, N. Y.; stockholders holding 1% or more of stock: Curtis W. McGraw, Executive of the Will of James H. McGraw, 330 West 42nd St., New York 18, N. Y.; James H. McGraw, Jr., Curtis W. McGraw and Willard T. Chevalier, Trustees for Harold W. McGraw, James H. McGraw, Jr., Donald C. McGraw, Curtis W. McGraw, all of 330 West 42nd Street, New York 18, N. Y.; James H. McGraw, Jr. and Curtis W. McGraw, Trustees for Catherine O'Brien, 330 West 42nd Street, New York 18, N. Y.; Edwin B. Wilsey and Curtis W. McGraw, Trustees for James H. McGraw, Jr., 330 West 42nd Street, New York 18, N. Y.; Curtis W. McGraw, 330 West 42nd Street, New York 18, N. Y.; Donald C. McGraw, 330 West 42nd Street, New York 18, N. Y.; Mildred W. McGraw, Madison, New Jersey; Grace W. Mehren, 525 Avenue St., Lafayette, Calif.
3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: None.

4. Paragraphs 2 and 3 include: in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

By J. A. Gerold, Secretary
McGraw-Hill Publishing Company, Inc.
Signed and subscribed before me this 26th day of September, 1949.
EVA G. MASLIN.
[SEAL] (My commission expires March 28, 1950.)

An Investment!

Productive advertising is an INVESTMENT rather than an EXPENDITURE.

"Searchlight" advertisers almost invariably report prompt and satisfactory results.

BE CONVINCED — send us your advertisement TODAY.

Address

Classified Advertising Division

COAL AGE

330 W. 42nd St., N. Y. 18, N. Y.

LOCOMOTIVES, ALL 250 VOLT

- 3-6-Ton Jeffrey, MH-88, 42 to 45" gage with R-E Motor Driven Reels.
 4-Ton Jeffrey, MH-96, 42 to 45" gage with R-E Motor Driven Reels.
 1-13-Ton Jeffrey, MH-143, 48" gage, 31" high, with Extra Armature.
 1-2-Ton Plymouth, Gasoline, 36" gage.
 1-8-Ton Plymouth, Gasoline, 36" gage.

CUTTING MACHINES, 250 VOLT

- 5-11-B Sullivan, 50-HP, Permissible, with bug dusters & 7 1/2" Bars.
 1-Goodman Universal with 7" Bar, Truck & Pony Truck.

SUB STATIONS

- 2-150-KW. G.E. Synchronous Motor-Generator sets complete with manual switchboards. Motors 225-HP. 2200/4000 Volt. Generators 275 Volt.
 1-100-KW. Westinghouse 6-phase Rotary Converter complete with transformers and manual switchboard, 275 volt.
 1-75-KW. West. Motor-Generator set complete, 2200 volt A.C., 275 volt D.C.
 1-500-KW. West. M-G Set complete with automatic board, 2200/4000 Volt A.C., 600 Volt D.C., will reconnect for 275 Volt D.C.

ENGINES AND GENERATORS

- 2-150-HP. General Motors Diesels with 100-KW. G.E. generators and switchboards.
 1-100-HP. Buda Diesel engine only.
 1-97-HP. Buda Diesel engine only.
 2-70-HP. Continental Red Seal engines only.

MISCELLANEOUS

- 1-Three Track, 300-TPH. Stephens-Adamson All Steel Tipples Complete.
 1-24"x24" Jeffrey Belt Conveyor outfit in Steel Gallery.
 29-Sanford Day Drop Bottom Mine Cars, 34" Gage.
 12-Sanford Day Drop Bottom Cars, 48" Gage.
 1000-45" Gage Lorain, and dump mine cars, Timken bearing, good condition.
 1-24"x36" Jeffrey Flextooth Crusher.
 3-200-KVA. G.E. Transformers, 1520/13200 to 2300 volt.
 2-37 1/2-KVA. G.E. Transformers, 2300 to 110/220 volt.
 3-25-KVA. G.E. Transformers, 2300 to 220/440 volt.
 3-15-KVA. G.E. Transformers, 2300 to 220/440 volt.
 Trolley & Feeder wire and hangers.
 A.C. and D.C. Motors and Starters.
 Speed Reducers, Shop Equipment and lots of other items of mining equipment and supplies.

Your Inquiries Appreciated
 Day or Nite Phone 610

R. C. JONES & COMPANY

Box 386 ASHLAND, KY.

FOR SALE

- 2-X12981CM 6'6"x2 1/2" Kerk Cutter Bars for Sullivan 5B. Cost \$747.00. Price: \$250.00 each.
 2-12125M Sprockets for above. Brand new. Cost \$121.99. Price: \$50.00 each.
 2-SK16761 Cutter Chains for above bars. Cost \$258.00. Price: \$250.00 each.
 1000 5x1 hardened Bits to fit above. Cost \$14.50 each. Price: 19c each.

Cutter Bars and Chains operated one hour in experimental work.

GEORGE C. WATSON

2325 Monaco Blvd.
 Denver, Colorado

FOR SALE

- 225 HP Busch Sulzer 150 KW diesel engine generator set.
 30 ton American steel stiffleg derrick, 100 foot boom.
 100 ton Baldwin diesel electric switching locomotive.
 35 ton Ohio built diesel crane. Gas powered. Built 1943.
 150 HP portable firebox boiler. ASME Code. 250# steam pressure.

MISSISSIPPI VALLEY EQUIPMENT CO.

511 Locust St. St. Louis 1, Mo.

for IMMEDIATE DELIVERY of RUBBER PRODUCTS

CALL WIRE
WRITE CARLYLE
 THE RUBBER HEADQUARTERS

CONVEYOR BELTING,
 TRANSMISSION BELTING,
 ELEVATOR BELTING,
 FIRE, WATER, AIR,
 STEAM, SUCTION and
 WELDING HOSE.

CARLYLE RUBBER PRODUCTS ARE NEW, GUARANTEED & LOW PRICED

CONVEYOR BELTING**ABRASIVE RESISTANT COVERS**

Width	Ply	Top-Bottom	Covers	Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"	24"	4	1/8"	1/32"
42"	5	1/8"	1/16"	20"	5	1/8"	1/32"
36"	6	1/8"	1/16"	20"	4	1/8"	1/32"
30"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	5	1/8"	1/16"	16"	4	1/8"	1/32"
26"	5	1/8"	1/32"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"

Inquire For Prices - Mention Size and Lengths

TRANSMISSION BELTING**ENDLESS "V" BELT****HEAVY-DUTY FRICTION SURFACE**

Inquire For Prices - Mention Size and Lengths	Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	8"	5	5
16"	6	10"	5	5"	5	5
14"	6	8"	6	4"	5	5
12"	6	8"	5	4"	4	4
12"	5	6"	6	3"	4	4

SPECIAL OFFER - HEAVY DUTY RUBBER HOSE

FIRE HOSE

APPROVED SPECIFICATION HOSE EACH LENGTH WITH COUPLINGS ATTACHED	I.D. Size	Length	per Length
2 1/2"	50 feet	\$28.00	
2"	25 "	16.00	
2"	50 "	23.00	
1 1/2"	25 "	13.00	
1 1/2"	50 "	20.00	
	25 "	11.00	

Specify Thread On Couplings

AIR HOSE

I.D. Size	Length	per Length	Universal Couplings
1/2"	25 feet	\$5.00	\$1.50 Pair
3/4"	50 "	10.00	1.50 Pair
1"	25 "	7.50	1.50 Pair
1"	50 "	15.00	1.50 Pair
1"	25 "	10.00	1.50 Pair
1"	50 "	20.00	1.50 Pair

LARGER SIZES ALSO AVAILABLE
 All Prices - Net - F.O.B. New York

WATER HOSE

I.D. Size	Length	per Length	I.D. Size	Length	per Length
3/4"	25 feet	\$4.25	3/4"	35 feet	\$10.50
1"	50 "	8.00	1"	40 "	12.00
1"	25 "	6.25	1"	50 "	15.00
1 1/4"	50 "	12.50	1 1/4"	25 "	10.00
1 1/4"	25 "	7.50	1 1/4"	35 "	14.00
			1 1/4"	50 "	20.00

Each Length with Couplings Attached

CARLYLE RUBBER CO., Inc.

62-66 PARK PLACE, NEW YORK 7, N. Y. Phone: BArlay 7-9793

ROTARY CONVERTERS**FOR SALE**

- 150 KW - GE
 200 KW - GE
 500 KW - West.

250 or 275 volts DC, 1200 rpm., pedestal type. With transformers (found to requirements) and AC and DC switchboards.

Also NEW motors at a big discount.

Your inquiries solicited

R. H. Benney Equipment Co.

5024 Montgomery Road Norwood, Ohio

FOR SALE

- 1 Goodman Style Q20B71 permissible Shaker Conveyors, latest type with 300 ft. size 3 troughs, manual Type HAD duckbill and 20 HP Westinghouse AC motor, 2 phase, 60 cycle, 220 volt, 1160 RPM.
 1 Sullivan Class 7B Cutting Machines, with 50 HP AC motor, 2 phase, 60 cycle, 220 volt, and Bowditch cutter bar and chain, 9 ft. long, 5" kerf.
 1 Chicago Pneumatic Style 674-700 post mounted coal drills, 220 volt, 60 cycle, 2 phase, AC.
 All of above to include usual accessories and guaranteed to be in A-1 condition. New in 1943.

KAISER COMPANY, INC.

Iron & Steel Division
 Sunnyside, Utah

SEARCHLIGHT SECTION

LATE TYPE CUTTING MACHINES 250 VOLT DC

8-Jeffrey 25-U Permissible Type Track Cutters.
10-Jeffrey 35-BB Permissible Type Shortwall.
15-Goodman 512-CJ Permissible Type Universal.
7-Goodman 112-AA Universal.
16 excellent operating condition, just taken out of service, offered at bargain prices for immediate disposition.

BELT CONVEYORS

4-Jay LaBel, 1500' centers, 30" Belt, and
1-Goodman, 2000' centers, 30" Belt, 8' sections.
Goodman 5-9p, 32' or 40', all complete with head and tail pulleys, motors and speed reducers.
Several 20" and 24" Joy Belt Conveyors.

LOADING MACHINES, 250 VOLT DC

8-Jay 14-BU.
8-Jay 8-BU.
1-Jay 7-BU.
6-Jay 11-BU.
5-Jay 12-BU.
2-Jeffrey L-400.
3-Jeffrey L-500.
3-Goodman 400.
2-Goodman 300.

STRIP MINE EQUIPMENT

1-Link Belt 576, 2 1/2' Yard, 20' Boom, 26' Stick, Cat Diesel Engine, Ser. No. 885167.
1-Link Belt 376, 1 1/2' Yard, 20' Boom, 25' Stick, Cat Diesel Engine, Ser. No. 494655.
1-Lorain 80—Dragline, 2 1/2' Yard, also shovel front for same, Cat Diesel Engine, Ser. No. 483653.
1-WD-14 Dzer, Ser. No. 4783, AC Diesel Motor, Ser. No. 671147602.
1-D-8 Dzer—2U Series, 2-D-8 Dzers—1H Series, and 1 TD18.

All of the above equipment is less than two years old.

WE ARE NOW SELLING EQUIPMENT FROM THREE ABANDONED MINES AND HAVE A WORLD OF AC AND DC SHORTWALL MINING MACHINES, LOADING MACHINES, ELECTRIC HOISTS, MOTOR GENERATOR SETS, ROTARY CONVERTERS, AND SEVERAL STEEL TIPPERS, ALL AT VERY ATTRACTIVE LOW PRICES.

WE SPECIALIZE IN BUYING OUTRIGHT COMPLETE MINES THAT ARE GOING OUT OF BUSINESS OR FROM RECEIVERS IN BANKRUPTCY, ADMINISTRATORS OF ESTATES, ETC.

COAL MINE EQUIPMENT SALES COMPANY

306-307 Beasley Building

L. D. Phone 34

Terre Haute, Indiana

LOCOMOTIVES, 250 VOLT DC, BALL BEARING MOTORS

2-15-ton Goodman, Type 38-A04C.
3-15-ton General Electric, Type HM-800.
3-15-ton Jeffrey MM-110.

Several 6, 8, and 10-ton General Electric, Westinghouse, Goodman, and Jeffrey Locomotives equipped with rods, all completely rebuilt and guaranteed. Offered at real low prices.

MINE CARS

400—All Steel Walt 3-ton Mine Cars, 42" gauge.
400—All Steel A.C.F. 5-ton Mine Cars, 42" gauge.
500—All Steel A.C.F. Low Vein, 3-ton Mine Cars, 20" high, 44" gauge.



Frank J. Wolfe—Sheldon J. Wolfe

CONVEYORS

Belt, Bucket, Drag or Gravity
Shaker & Vibrating Screens
Track Scales — Coal Crushers
Coal Drills — Car Spotters —
Mine Fans — Electric Motors
Floor Cranes — Mining and
Stripping Equipment

WHAT DO YOU NEED?

THE INDUSTRIAL EQUIPMENT CORP.
910 First National Bank Bldg., Atlantic 6387
Pittsburgh 22, Pa.

IN STOCK USED D.C. MOTORS

7 1/2 hp. G.E. 220 v.—450/1800 r.p.m.

7 1/2 hp. G.E. 1 v.—800/1200 r.p.m.

7 1/2 hp. G.E. 220 v.—1150 r.p.m.

5 hp. C-W Vertical, 500 v.—900 r.p.m.

5 hp. G.E. 220 v.—450/1800 r.p.m.

5 hp. West. 220 v.—435 r.p.m.

1 hp. G.E. 220 v.—925/2100 r.p.m.

1 hp. G.E. 220 v.—1150 r.p.m.

AVAILABLE FOR IMMEDIATE SHIPMENT

ALL MOTORS TESTED AND "IN STOCK"

FALK MACHINERY COMPANY

18 Ward St., Rochester, N. Y.

HAMILTON 8745

NEW AND REBUILT STORAGE BATTERY

LOCOMOTIVES

1 1/2 to 10 Ton 12" to 56" Track Gauge
GREENSBURG MACHINE CO.
Greensburg, Pa.

BARGAINS FOR SALE

100 KW. Diesel Engine Generator Sets

11—100 kw., 250/275 V. D.C. Delco Generators dir. con. to 150 HP. CBD-8, 5 1/2"x7, 8 cyl. Superior DIESEL Engines, Elec. starting, power panels and accessories.

2—100 kw., same as above with 220/400 V. New A.C. Generators.

2—35 kw., 250 V. D.C. NEW GAS or GASOLINE Engine Generator Sets.

4—37 1/2 kw., 220/440 V. 3 ph. 60 cy. NEW Gas or Gasoline, also Diesel Engine Generator Sets.

11—3 kw., 120/220 V. 1 or 3 ph. dir. con. Hercules GASOLINE.

MINING MACHINE

1—35 B Jeffrey 250 volt D.C., 36" ga.

STOCK SHIPMENT

MOTOR GENERATOR SETS—50 to 200 kw.

D.C. Generators, 75, 100, 150 and 200 kw. A.C. and D.C. Motors, all sizes 1 to 500 HP.

TRANSFORMERS, WINCHES, HOISTS, CAR PULLERS, ROOM HOISTS, PUMPS, BRAND NEW CONTROL.

Write for New Catalog.

DUQUESNE ELECTRIC & MFG. CO.

PITTSBURGH 6, PA.

TRANSFORMERS FOR SALE

3—500 KVA A-Ch 33000—2300
3—500 KVA G-E 2400—240/480
1—400 KVA G-E 13200—120/240
3—333 KVA G-E 33000—2300/4000Y
3—333 KVA G-E 13800—120/240
6—333 KVA A-Ch 12000—600
2—200 KVA G-E 6900/11950Y—440/230/115

3—150 KVA G-E 22000—2300/4000Y
3—150 KVA G-E 11000—2300/4000Y
3—150 KVA G-E 6600—220/440
3—150 KVA L-M 2400/4160Y—120/240

2—150 KVA A-Ch 2400—120/240
2—100 KVA G-E 33000—2300
3—100 KVA G-E 11000—2300/4000Y
6—100 KVA G-E 11500—230/440
3—50 KVA G-E 33000—2400/4160Y
3—50 KVA Pitts 26400—2300/4000Y
3—50 KVA W-H 4800/8320Y—120/240

Many other items in stock.

TRANSFORMERS WANTED

Reliable rewind and repair service on all makes of transformers.

THE ELECTRIC SERVICE CO.

Cincinnati 27, Ohio

FOR SALE

150 HP Fairbanks Morse engine.
2—61 W Jeffrey Conveyors.
3—61 A & Jeffrey Conveyors.
1—HQ Jeffrey Conveyor.
1—12-BU Joy loader.

MASON & SONS COAL CO.

Coshocton, O.

NEW WIRE ROPE FOR SALE 6 X 19 IWRC & HEMP CENTERS

7/8" dia. IMPROVED FLOW STEEL, 6x19, PRE-FORMED, IND. WIRE ROPE CENTER; 10 reels—2000 ft. each reel.
1 1/2" dia. 6x19 IWRC, 1000 ft. reels (20 REELS).
1 1/2" dia. 6x19 IWRC, 3045—228"—200"—154" EA. REEL.

HEMP CENTER ROPES IN ALL SIZES from 3/8" to 1 1/2" diameter. 6 x 19. CONVEYOR BELTING; PROOF COIL CHAIN; Y&T CHAIN HOISTS; WIRE ROPE CLIPS.

PRICES WAY BELOW COST. IMMEDIATE SHIPMENT. SEND FOR LIST.

TERRENCE P. WYNN

P. O. Box 1118, New York 33, New York

TRANSFORMERS

CIRCUIT BREAKERS

NEW — REBUILT — RENTALS

1 H.P. to 2500 H.P. motors in stock
D.C. A.C., 25-50-60 Cycle

ELECTRIC EQUIPMENT CO.
ROCHESTER 1, N. Y.



CASH FOR YOUR SURPLUS



FOR SALE

25,000-ft. 24-2/c round 133-strand flexible Neoprene jacketed Battery Charging Cable on 1000-ft. reels, 29-cy. ft., F.O.B. Chicago.

Universal Wire & Cable Co.

2602-2718 Clybourn Ave. Chicago 14, Ill.

FLOTATION MACHINES

3—No. 24, 8-cell, Denver "Sub A" Flotation Machines, wood tanks, rubber impellers, 43"x43" cells, motorized.

JIGS

2—New 18"x36", 4-compartment Hartz Jigs, Oregon Fir Construction.

FILTER

1—4", Six Disc Eimco Filter, complete with vacuum equipment—motorized.

GENERATORS — DIESEL

3—1D-13000 Caterpillar Diesel Generators, 75 KW, 440 volts, AC.
1—D-4400 Caterpillar V-belted to 30 KVA, AC Generator.

FREIGHT ELEVATORS

1—Nock & Garside Continuous, Push-button Type, Capacity 3000 lbs. Traveling Speed 235 RPM, direct connected to 25 HP Motor, complete with counter weights, wire rope, etc.

PIT CARS

150—Card Iron Works R.B. Pit Cars, 36" gauge.
1—Card Iron Works Rock Car, 90 cu. ft. capacity.

BINS & WATER TANKS

2—20"x20" Wood Stave Bins.
1—Wood Stave Water Tank 20' dia. x 12' high.

WAGON DRILLS

1—Ingersoll Rand, with drifter, all on pneumatic tires, used about 6 months.
1—Sullivan #1W-6, with drifter, on steel wheels. AC Motor.

TROLLEY LOCOMOTIVES

2—7½ Ton Godmans, 36" gauge, 250 volts DC.

LARRY CARS

4—Connellsville Larry Cars, Trolley Operated, 6 Ton Capacity.

COAL CRUSHERS

1—36" American Ring Type.

MAGNETIC PULLEYS

1—24" Belt Feeder, 5'6" centers, with 26" face x 24" dia. Dings Magnetic Pulley, R.C. Drive to 2 HP Gear Motor, complete with motor generator set.
2—26" face x 24" dia. Dings 250 volts DC Magnetic Pulleys.

COAL WASHING EQUIPMENT

2—Rheolaveur Launders, complete with steel supporting frame. 1—60" dia. Dividing Table, direct connected to 2 HP DC Motor.
1—Gulgher Auto. Sampler with adjustable stroke and direct connected to a 1/6 HP Motor.
1—12"x10" Steel Hopper Bin.
1—70"x12" Dorr Thickener Tank, complete with mechanism.

BELT CONVEYORS

1—14", 20' centers, new belt, V-belted to 1½ HP Motor.
1—24", 15' centers, Motorized.
1—30", 30' centers, new belt, on steel frame R.C. Drive to a 2 HP Gear Motor.
1—42", 20' Centers, Motorized.

MISCELLANEOUS EQUIPMENT

2—1½ Ton Coffing Single Chain Hoists.
Electric Mine Gongs.
Wooden Telephones.
Air Receivers.
1—Maurer Type Box Car Loader—5 HP Motor.
1—45" Universal Mine Fan with built-in 2 HP Motor.
Motors ½ HP to 75 HP—New and Used.
Mine Cages.
Hydraulic Slurry Pumps—2" to 8".
Revolving Screens.
Fire Extinguishers.
1—CE-7 Sullivan AC Coal Cutter.

WRITE FOR NEW BULLETIN NO. 10

FLORENCE MACHINERY AND SUPPLY COMPANY

SUITE 904, EQUITABLE BUILDING

C. J. PARRISH, MGR.

DENVER 2, COLORADO

Mine and Slope Hoists

1—20,000# Dbl. Drum Mundy, w/o motor
1—26,000# Nordberg Sgl. Drum
1—10,000# Nordberg Sgl. Drum AC
1—17,000# Othumwa Sgl. Drum AC
1—11,000# Othumwa Sgl. Drum AC
1—16,000# Allis Chalmers Sgl. Drum
1—30,000# Allis Chalmers Dbl. Drum AC
1—7,000# Allis Chalmers Dbl. Drum AC
1—7,000# Flory Sgl. Drum AC
1—10,000# Wellman AC

Crushers and Screens

1—12x16 Eagle Dbl. Roll
1—18x20 Eagle Dbl. Roll
1—3B American Pulverizer
1—30x54 McNally Pitts. Sgl. Roll
2—24x20 Jeff. Flextooth
1—25S Kennedy Van Saun Gearless
1—Superior McCully 8" Gyrtatory
1—30x36 S.A. Ring type Knittel (never used)
2—4x10 S.A. Vibrating Screens
4—Tyler Vibrating Screens

Carpullers and Loaders

1—5000# Jeffrey Carspotter AC
1—6000# Brownie Carspotter AC
1—5000# Link Belt Carspotter AC
1—S.A. Heavy Duty Loader AC

Miscellaneous

1—5 ton Merrick Weighometer
2—2½" Dayton Dowd 300 GM Cent. Pump, AC Motor
1—48" Colo. Simplex Classifier
2—100 ton, 5 sheaves; 2—50 and 2—40 ton 4 sheave blocks, complete, new.
1—11B Sullivan Cutter with Bowdell bar, chain and bug duster, 50 HP DC motor
1—PL114 Joy Elevator, 10 HP DC, permissible motor.
1—B.E. ¾ yd. Electric Shovel

HAWKINS & CO.

134 So. Michigan Ave., Chicago 3, Ill.
TELEPHONE HARRISON 7-0725

MOTOR GENERATORS

1—400 KW WEST. Syn. 575 V. 720 RPM
2—300 KW G.E. Syn. 225 V. 1200 RPM
1—200 KW G.E. Syn. 275 V. 1200 RPM
1—150 KW G.E. Syn. 275 V. 1200 RPM

SYNCH. CONVERTERS

1—600 KW WEST. 275 V. 1200 RPM
1—300 KW G.E. 275 V. HCC 1200 RPM
1—300 KW G.E. 575 V. HCC 1200 RPM

GENERATOR ARMATURES

1—500 KW G.E. 275 V. MFC Form L 900 RPM
1—500 KW G.E. 575 V. MCF Form H 900 RPM

CONVERTER ARMATURE

1—300 KW G.E. 575 V. HCC Form P. 1200 RPM

WALLACE E. KIRK CO.

501 GRANT BUILDING

PITTSBURGH, PA.

LOCOMOTIVES

2—30 T JEFFREY 250 V. MH-77 48-36" Ga.
1—20 T JEFFREY 250 V. MH-77 48-36" Ga.
3—13 T JEFFREY 250 V. MH-2110 42-32" Ga.
1—13 T G.E. 250 V. MH-827 44-36" Ga.
1—10 T JEFFREY 250 V. MH-110 44-32" Ga.
1—8 T JEFFREY 250 V. MH-100 42-32" Ga.
1—8 T G.E. 250 V. HM-839 44-36" Ga.
1—8 T WEST. 250 V. ML-904-C 44-36" Ga.

LOCOMOTIVE MOTORS

2—JEFFREY 250 V. MH-77, Ball Bearing
2—G.E. 500 V. HM-826-A, Ball Bearing
2—WEST. 250 V. ML-908-C, Ball Bearing
2—WEST. 250 V. ML-907-C, B.B. (New)
2—WEST. 250 V. ML-904-C, Ball Bearing
2—WEST. 250 V. ML-904-R, B.B. (New)
1—WEST. 250 V. ML-901-C, Ball Bearing
2—G.E. 85/125 V. HM-828-A, Ball Bearing

Electrical Equipment

Converters, Motor Generator Sets, A.C. and D.C. Motors, Control Equipment and Transformers.

We build equipment to fit your requirements. Over 25 years engineering background.

MOTORS

150 HP, 900 RPM. Elec. Mach., 220/3/60 Sys.
125 HP, 1800 RPM. West. G.K. 225 v. D.C.
80 HP, 1200 RPM. Cr. Wk. 220/440/3/60 Ind.
75 HP, 900 RPM. Elec. Mach., 220/3/60 Sys.
75 HP, 1800 RPM. US 220/440/3/60 Ind.
S. 7½, 10 and 15 HP, AC & DC TEFC & Open.
Send Us Your Transformer Inquiries.

SYNCHRONOUS ROTARY CONVERTERS

Q.	KW	6 ph. 60 cycle	Speed	DCV
1	500	G. E.	1200	880
1	500	G. E.	1200	880
1	500	G. E.	1200	880
1	175	G. E. or West.	1200	275
1	75	G. E. (3 Ph)	1800	275

WE BUY—SELL—RENT

C. B. LOCKE CO.

P.O. BOX 3227, TEL. 38-136
CHARLESTON, W. VA.

NEW and REBUILT

SEARCHLIGHT SECTION

VIBRATING SCREENS CONVEYORS—FEEDERS SCALES—CRUSHERS CONVEYOR IDLERS

Guaranteed Equipment
Immediate Shipment

TRUCK SCALES	
15 Ton Truck Scales	\$450.00
20 Ton Truck Scales	\$10.00
24 Ton Truck Scales	\$45.00
Other scales to 50 ton capacity. All truck scales complete with structural steel weighbridge. Replacement parts for most all makes of scales.	

MINE TRIPPLE SCALES	
5 Ton Trippl Scales	\$312.00
15 Ton Trippl Scales	\$480.00
20 Ton Trippl Scales	\$465.00

CRUSHERS	
Stoker Coal Crusher	\$375.00
Coal Crushers, 60 to 200 tons per hour capacity	795.00
Coal Crushers, 90 to 375 tons per hour capacity	1795.00
Coal Crushers, 120 to 500 tons per hour capacity	2295.00

FEEDERS	
15 to 35 ton capacity	\$150.00
20 to 40 ton capacity	190.00
50 to 100 ton capacity	\$75.00
100 to 175 ton capacity	\$900.00

VIBRATING SCREENS
Approximately 100 machines in stock, ranging in screen sizes from 2"x1' to 5'x14' and with 1 to 5 decks. Eccentric weight or positive throw eccentric shaft types.
Prices from \$375.00

CONVEYORS—PICKING TABLES
Troughing idlar conveyors—picking tables. Lengths from 10' to 500', widths to 60".
Prices from \$375.00

TROUGHING AND PICKING TABLE IDLERS
All steel, interchangeable with other well-known makes of idlers. Fraction ball bearings with aluminum fittings. Replaceable bearings. Shafts run clear through, and no bearing adjustments are required. Easy to start and will run in cold weather. Rust-proof ball races; maintenance is negligible. Build your own conveyors: We have all parts, including standard sections, head and tail pulleys, take-ups, drives, idlers, speed reducers, thunders, belting, etc.

3-roll Troughing Idlers:	
14" belt width	\$18.50
16" belt	19.80
18" belt	20.00
20" belt	21.00
24" belt	24.00

1-roll Return Idlers:	
24" belt width	\$9.75
30" belt	9.00
36" belt	10.50
42" belt	11.25

More than 2000 mines have Bonded equipment. Send for catalog and prices.

BONDED SCALE & MACHINE CO.

2190 S. Third St. Columbus 7, Ohio
Phone Garfield 2186
University 2833, Eves.

Manufacturers of Scales, Conveyors, Conveyor Supplies, Idlers, Vibrating Screens, Crushers and Feeders.

NON-CORRODING PIPE FOR SALE

Texolite lightweight laminated plastic pipe manufactured for the Government by General Electric Co., and now surplus. Unused. Resists the effects of corrosive waters and atmospheres, chemical salts and solutions, solvents, gasoline, etc. A high pressure pipe, 5" O.D. with 3/4" wall. Offered threaded and complete with pipe type couplings of like material. Lower cost than iron pipe with additional savings from easy handling. Ideal as mine piping. Specifications and technical data with a sample of material free on request. This material will stand the most rigid technical examination.

IRRIGATION DIVISION VEG-ACRE FARMS Forestdale, Mass.

LOCOMOTIVES FOR SALE OR LEASE

2—100 ton, diesel electric, tractive effort 50,700 lb., four traction motors, new 1940-42, excellent condition for ICC.
1—44 ton, GIE 380 HP railway type diesel electric switcher, new 1945, Caterpillar D-17000 diesel units, four traction motors.
2—45 ton Porter saddle tank steam locomotives, new 1942, immediate delivery.

LOCOMOTIVE CRANES

1—Ohio Model F 30 ton diesel powered new 1940, double drum, Caterpillar diesel unit.
2—Ohio Model G 25 ton gas powered new 1943 but unused. Ruda power units, double drums.

CARS

25—all steel 70 ton capacity hopper cars.
20—all steel 50 ton drop bottom gondolas.
19—all steel 20 cu. yd. air dump cars.
Our stock includes many other locomotives, cars, cranes and heavy equipment items.

We invite your inquiries.

Write — Phone — Wire

Pan-American Engineering Co.
P. O. Box 2376 Dallas, Texas Telephone L.D. 339

FOR SALE COAL CRUSHERS

Very Cheap
For Quick Disposal

1—24" x 36" Jeffrey Flextooth.
1—Large Wilmott Double Roll.

R. C. Jones & Company
Box 386 Ashland, Ky.
Phone 610

— FOR SALE —

Two—Modern Jeffrey Aerodyne 5' Fans with motors, control equipment and tube. \$800.00 each—\$1,600.00 for both.

BEN HUR COAL COMPANY
P. O. Box 839, Henryetta, Oklahoma

R. T. McNEES

COAL MINE EQUIPMENT
NORTON, VIRGINIA

Hotel
Norton

Phones
608 & 300

RAILS-TIES TRACK ACCESSORIES

EVERYTHING FOR THE TRACK FROM SWITCH TO BUMPER

R. R. TIE PLATES

Excellent Rates

100,000 9 1/2" x 9 1/2" for use with 78# to 80# Rails.
50,000 7 1/2" x 10 1/2" for use with 80# to 115# Rails.

MORRISON
RAILWAY SUPPLY CORP.

WAND BLDG. EMPIRE BLDG.
BUFFALO 3, N. Y. BIRMINGHAM 3, ALA.

RELAYING RAIL

TRACK ACCESSORIES

MIDWEST STEEL CORP.

Gen. OE.: CHARLESTON 31, W. VA.

Warehouses: CHARLESTON, VA.
KNOXVILLE, TENN. • PORTSMOUTH, VA.

RAILS

NEW AND

RELAYING

Track Accessories

• Prompt Shipments

• Fabricating Facilities

• Trackage Specialists

from 5
warehouses

L. B. FOSTER CO.

NEW YORK — PITTSBURGH

CHICAGO — HOUSTON

Address the faster Office Nearest You

RELAYING RAIL

All Sizes

Track Accessories

LEFFON INDUSTRIAL CORP.

Genl. Office: 212 Victor St.

St. Louis 4, Mo.

RAILS — CARS

All sections of rails and good serviceable second hand cars, also gauges, also spikes, bolts, frogs, switches and ties.

M. K. FRANK

480 Lexington Ave. 810 Park Bldg., Fifth Ave.
New York, N. Y. Pittsburgh 22, Pa.
Reno, Nevada Carson City, Pa.

Complete coal washery and equipment, including one large McNally Pittsburg coal washing jig No. 552, one No. 2 McNally Pittsburg Unit Washery and one No. 1 McNally Pittsburg Rewash unit, vibrating screens, pumps, crushers, conveyors, etc. This plant made available by reason of depletion and the opening of an entirely new property.

CROWE COAL COMPANY Clinton, Missouri

COAL AGE ADVERTISERS IN THIS ISSUE

An asterisk preceding manufacturer's name indicates detailed information may be found in the 1948-49 MINING CATALOGS

Ajax Flexible Coupling Co., Inc.	160
*Allis-Chalmers Mfg. Co.	16, 30, 48
*Allis-Chalmers Tractor Div.	10-11
*American Cable Div. of American Chain & Cable Co.	Third Cover
*American Car & Foundry Co.	33
American Crucible Products Co.	120
*American Manganese Steel Div.	156
American Optical Co.	42
*American Pulverizer Co.	14
*American Steel & Wire Co.	49
Anaconda Wire & Cable Co.	39
*Ansonia Electrical Co.	63
Armo Drainage & Metal Products, Inc.	126
Armstrong-Bray Co.	175
Atlas Powder Co.	38
Aurora Pump Co.	177

Baltimore & Ohio Railroad	123
*Barber-Greene Co.	118
*Bemis Bro. Bag Co.	167
*Bethlehem Steel Co.	12, 44, 54
*Bird Machine Co.	7
*Bisby-Zimmer Engrs. Co.	170
Bonded Scale Co.	170
Boston Woven Hose & Rubber Co.	21
*Bowditch Co.	28-29
Bucyrus-Erie Co.	62
Byron-Jackson Co.	37

Carboloy Co., Inc.	129
Cardox Corp.	46-47
Carter Products Corp.	56
Caterpillar Tractor Co.	13
Central Mine Equipment Co.	119
Chicago Perforating Co.	177
*Chicago Pneumatic Tool Co.	64
*Cincinnati Electrical Tool Co.	174
*Cincinnati Mine Machinery Co.	173
Clarkson Mfg. Co.	141
Combustion Engrs.-Superheater, Inc.	161
Flash Dryer Div.	161
*Connellsville Mfg. & Mine Supply Co.	149
*Crane Co.	143

*Detroit Diesel Engine Div., General Motors Corp.	145
Dodge Div., Chrysler Corp.	155
*Dravux Corp.	170
Duff-Norton Mfg. Co.	154
*duPont de Nemours & Co., E. I. (Rayon Div.)	139
*duPont de Nemours & Co., E. I. (Explosives Div.)	153

Eaton Mfg. Co.	Insert between pp. 52-53
*Electric Storage Battery Co.	97
*Ensign-Bickford Co.	68
*Enterprise Wheel & Car Corp.	57

*Fairmont Machinery Co.	36
*Farmers Engrg. & Mfg. Co.	122
Flexible Steel Lacing Co.	171
*Flood City Brass & Electric Co.	164
Foots Mineral Co., Inc.	174
Fuller Mfg. Co., Transmission Div.	20

Gates Rubber Co.	32
*General Electric Co., Apparatus Dept.	22-23
*General Electric Co., Construction Materials Dept.	43, 135
General Scientific Equipment Co.	166
*Goodman Mfg. Co.	58-59
Goodrich Co., B. F.	1, 99
Goodyear Tire & Rubber Co.	15
Greensburg Machine Co.	166
Gulf Oil Corp.	55
Gulf Refining Corp.	55
Guyana Machinery Co.	120, 166, 170

Hamilton Rubber Mfg. Co.	103
Harnischfeger Corp.	45
*Hazard Insulated Wire Works	4
Hein-Werner Corp.	6
*Hendrick Mfg. Co.	164
Hewitt Rubber of Buffalo, Div. of Hewitt Robins, Inc.	24-25
*Hoffman Bros. Drilling Co.	177
*Holmes & Bros., Inc., Robt.	116
Hulbert Oil & Grease Co.	2-3
*I-T-E Circuit Breaker Co.	113
*Independent Pneumatic Tool Co.	121
*Indiana Foundry Co.	171
International Harvester Co.	109
International Salt Co.	159

*Jeffrey Mfg. Co.	117
Insert between pp. 20-21	111
Jones & Laughlin Steel Corp.	111
Joy Mfg. Co.	117
Insert between pp. 36-37	174

*Kennametal, Inc.	53
*Koehring Co.	50-51
*Laughlin Co., Thomas	118
Leese-Neville Co.	171
Lima Shovel & Crane Div., Lima Hamilton Corp.	52B
*Link-Belt Co.	Fourth Cover
Lubriplate Div., Fluke Bros. Refining Co.	175

Mack Trucks, Inc.	137
Macwhyrte Co.	52
McGraw-Hill Book Co.	176
*McGraw-Hill Catalog Service	167
*Mosebach Electric & Supply Co.	168
Mott Core Drilling Co.	167
*Myers-Whaley Co.	127

*Nichols Engrg. & Research Corp.	163
----------------------------------	-----

Ohio Brass Co.	26, 27, 101
----------------	-------------

Paris Mfg. Co.	125
Pennsylvania Drilling Co.	176
*Quaker Rubber Co.	157

Robins Conveyor Div., Hewitt-Robins, Inc.	24-25
Roebling's Sons Co., John A.	31
Rome Cable Co.	65
*Rubenoid Co.	165

S K F Industries, Inc.	66
*Salem Tool Co.	156
*Sanford-Day Iron Works	60-61
*Schramm, Inc.	158
Searchlight Section	178-183
*Simplex Wire & Cable Co.	17
Slacair Refining Co.	34-35
*Sprague & Henwood, Inc.	168
Standard Oil Co. (Indiana)	18-19
Star Jack Co.	122
Stearns Magnetic Mfg. Co.	169
Sterling Steel Castings Co.	67
Sun Oil Co.	130
Syntro Co.	128

Texas Co.	6-9
*Thermoid Co.	107
Tide Water Associated Oil Co.	41
*Timken Roller Bearing Co.	105
Troy Refining Co.	176

United Engineers & Constructors, Inc.	133
*United States Steel Corp.	49

Victaulic Co. of America	124
--------------------------	-----

Walworth Co.	126B
*Wedge-Wire Corp.	168
West Virginia Bearings, Inc.	175
*West Virginia Steel & Mfg. Co.	162
Westinghouse Air Brake Co.	174
Westinghouse Electric Corp., Second Cover	
Whitney Chain & Mfg. Co.	40
*Wickwire Spencer Steel Div., Colorado Fuel & Iron Works	Insert between pp. 128-129
*Willam Products, Inc.	160
Wise Co., O. B.	174
Wyandotte Chemicals Corp., Michigan Alkali Div.	163

PROFESSIONAL SERVICES

SEARCHLIGHT SECTION (Classified Advertising)

EMPLOYMENT

Positions Vacant	178
------------------	-----

EDUCATIONAL

Books	178
-------	-----

BUSINESS OPPORTUNITIES

Offered	178
---------	-----

NOTICES

Legal	178
-------	-----

EQUIPMENT

(Used or Surplus New)	
For Sale	178-181
Rail	182

WANTED

Equipment	178
-----------	-----

ADVERTISERS INDEX

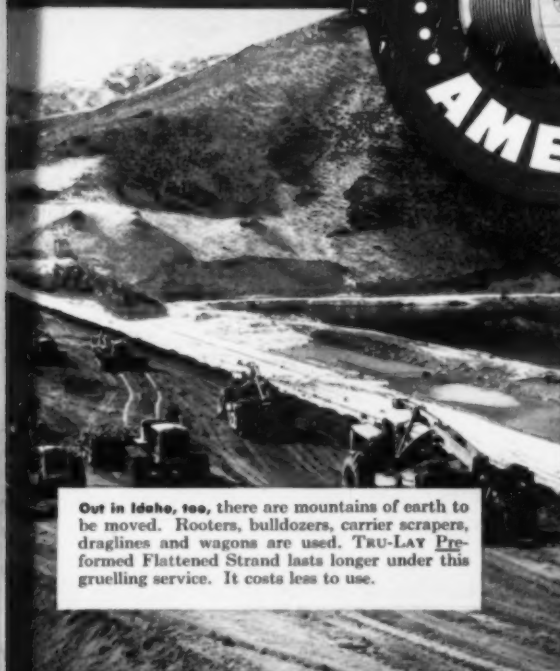
Benney Equipment Co., R. H.	179
Bonded Scale & Machine Co.	182
C & S Machinery Co.	183
Carlisle Rubber Co., Inc.	179
Coal Mine Equipment Sales Co.	180
Crowe Coal Co.	182
DeCorte Coal Co., John	183
Duquesne Electric & Mfg. Co.	180
Electric Equipment Co.	180
Electric Service Co., Inc.	180
Enzian, Geo. H.	178
Falk Machinery & Supply Co.	180, 183
Florence Machinery & Supply Co.	181
Foster Co., L. B.	182
Frank, M. K.	182
Gavenda Bros., Inc.	183
Gillespie & Son, Thomas	178
Greenburg Machine Co.	180
Hawkins & Co.	181
Hur Coal Co., Ben	182
Industrial Equipment Corp., The	180
Jones & Co., R. C.	179, 182
Kaiser Co., Inc.	179
Kirk Co., Wallace E.	181
Leffon Industrial Corp.	182
Locke Co., C. B.	181
Mason & Sons Coal Co.	178, 180
McNew, R. T.	152
Midwest Steel Corp.	182
Mississippi Valley Equip. Co.	179
Moorehead Electrical Machinery Co.	183
Morrison Railway Supply Corp.	182
Moss & McCormack Coal Co.	183
Pan-American Engineering Co.	182
Smith Co., H. Y.	178
Universal Wire & Cable Co.	180
Veg-Acre Farms	182
Watson, Geo. C.	179
Wynn, Terrence P.	180



In Southern Illinois strip mining is big business. The shovels and draglines that remove overburden are big, too. TRU-LAY Preformed in large sizes has excellent qualities that make it a favorite for strip mining.



At Detroit a portal crane straddles gondola cars and loads them with foundry sand from storage piles. TRU-LAY Preformed is made in a construction designed for longer service under such abrasive conditions.



Out in Idaho, too, there are mountains of earth to be moved. Rooters, bulldozers, carrier scrapers, draglines and wagons are used. TRU-LAY Preformed Flattened Strand lasts longer under this gruelling service. It costs less to use.



A dam is built in Washington. Maybe it's different from a dam in North Dakota or Mississippi but the same types of wire rope are used on the cranes, hoists, and cableways. TRU-LAY Preformed gives the same fine service . . . "All Around America."

ACCO



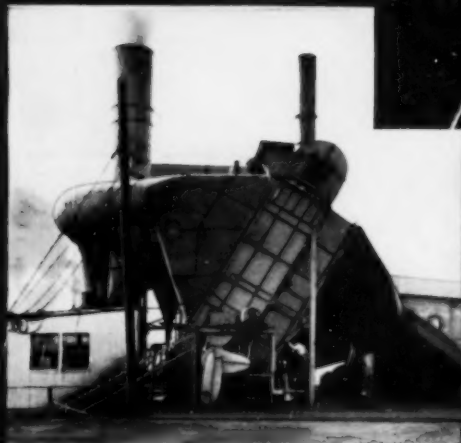
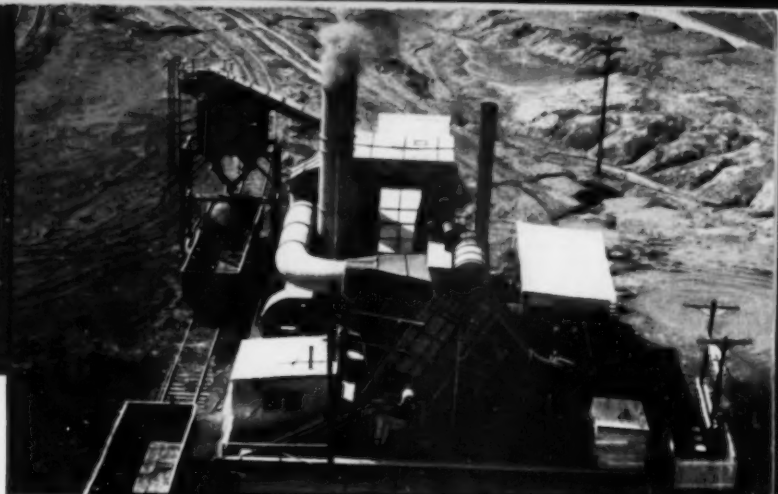
Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Seattle, Tacoma, Bridgeport, Conn.

AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE

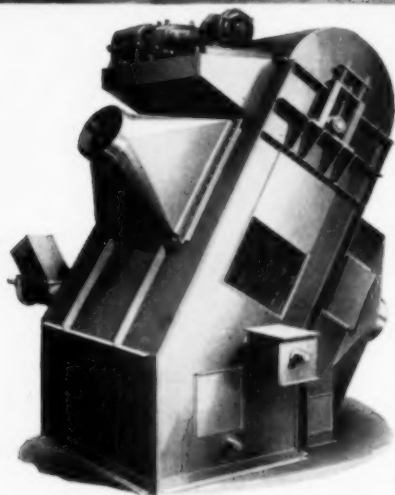
In Business for Your Safety

Tru-Lay
Preformed
Wire Rope

Link-Belt's new slurry dryer plant is designed to reclaim coal from slurry dumps. The plant is built to handle 35 T.P.H. of reclaimed slurry taken from dump piles. Several million tons of this sludge, the greater percentage of which is minus No. 10 mesh, is available to be dried for use as pulverized fuel in public utility plants.



LINK-BELT Multi-Louvre Dryer Reclaims Coal from Slurry Dumps



MULTI-LOUVRE dryer, such as used in coal preparation plants.

Another example of the use of Link-Belt equipment to raise efficiency and save money in the coal industry is afforded by a MULTI-LOUVRE dryer plant in the coal fields, put in to handle 35 T.P.H. of reclaimed slurry taken from dump piles. Several million tons of this sludge, the greater percentage of which is minus No. 10 mesh, is available to be dried for use as pulverized fuel in public utility plants.

The product as reclaimed has about 12% surface moisture; the sludge is dried down to 1% surface moisture.

The sludge is delivered to the dryer plant by trucks or railroad cars and dropped into a dump hopper. It leaves the dump hopper on an inclined feeder-conveyor and is dropped into the screw conveyor feeding the dryer. The discharged product is removed from the dryer by an inclined flight conveyor to a transfer point where it is conveyed at right angles by another inclined flight conveyor to the loading hopper, from whence it is discharged into railroad cars.

We'll be glad to work up for you a similar sludge drying installation or other types of coal drying plants where the MULTI-LOUVRE dryer works out so well in drying coal.

LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh 13, Wilkes-Barre, Huntington, W. Va., Louisville 2, Denver 2, Kansas City 6, Mo., Cleveland 15, Indianapolis 6, Detroit 4, Birmingham 3, St. Louis 1, Seattle 4, Toronto 8.

11,622

COAL PREPARATION AND HANDLING EQUIPMENT

**Engineered
and Built by**



LINK-BELT